

**RECONNAISSANCE SURVEY (G-4 STAGE) FOR GRAPHITE
IN KANAPULISI BLOCK, RAYAGADA DISTRICT, ODISHA**
(F.No. 23/411/NMET-2023/390)



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कनापुलिसी ब्लॉक, रायगड़ा जिला, ओडिशा में ग्रेफाइट के लिए टोही सर्वेक्षण (जी-4चरण)

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अध्याय 1

सारांश

ओडिशा के रायगढ़ जिले के कनापुलिसी ब्लॉक में एफ. सं. 23/412/2023-एनएमईटी/390 के अंतर्गत ग्रेफाइट के लिए एक पुनरीक्षण सर्वेक्षण (जी-4 चरण) किया गया। यह क्षेत्र पूर्वी घाट मोबाइल बेल्ट के पश्चिमी खोंडालाइट क्षेत्र के अंतर्गत आता है। ग्रेफाइट की उपस्थिति को समझने के लिए 65 एम/एल1 के दक्षिणी भाग का गठन करने वाले 98.30 वर्ग किमी के क्षेत्र को 1:12,500 पैमाने पर मैप किया गया है। सतह पर ग्रेफाइट के ग्रेड का पता लगाने के लिए 100 बेड रॉक नमूने एकत्र किए गए, ग्रेफाइट निकाय के विस्तार का पता लगाने के लिए 4.6 लाइन किमी एसपी सर्वेक्षण और 100 क्यूबिक मीटर ट्रेचिंग पूरी की गई और यदि संभव हो तो उपसतह में खनिजकरण और संसाधन आकलन का अध्ययन करने के लिए 500 मीटर ड्रिलिंग पूरी की गई।

चार्नोकाइट, ग्रेनाइट गनीस और खोंडालाइट प्रमुख लिथोलॉजिकल इकाइयाँ हैं, साथ ही लेप्टीनाइट, कैल्क-ग्रेन्युलाइट और बेसिक ग्रेन्युलाइट के आउटक्रॉप भी कई स्थानों पर पाए जाते हैं। अधिकांश चट्टानें सामान्य रूप से पर्णित हैं - NNW-SSE और दक्षिण-पश्चिम की ओर 45° ढलान। चट्टानों में खनिज संयोजन यानी सिलिमेनाइट-गार्नेट-ऑर्थोक्लेज़-प्लेगियोक्लेज़-क्वार्ट्ज़, ऑर्थोपायरोक्सीन-क्लिनोपायरोक्सीन-प्लेगियोक्लेज़ और क्वार्ट्ज़-प्लेगियोक्लेज़-पाइरोक्सीन-गार्नेट-मेटामॉर्फिज्म के ग्रेन्युलाइट पहलुओं के संकेत हैं। इस क्षेत्र में ग्रेफाइट खनिज प्रसार और शिस्टोज प्रकार के रूप में पाए जाते हैं। छोटे फैले हुए ग्रेफाइट के गुच्छे आम तौर पर खोंडालाइट और ग्रेनाइट नीस में पाए जाते हैं, जो कि पर्णन के समानांतर उन्मुख होते हैं जो आर्थिक रुचि के नहीं होते हैं ग्रेफाइट की घटनाएँ खोंडालाइट और ग्रेनाइट नीस के बीच की सीमाओं पर शिस्टोज प्रकार में होती हैं।

उत्साहजनक विश्लेषणात्मक परिणामों वाले प्रमुख ग्रेफाइट बैंड कोडाबाटा (19°20'39.0"N, 83°36'14.0"E), ताला बरंगापदार (19°20'27.0"N, 83°36'51.0"E) और अलुबरही (19°19'45.0"N, 83°38'09.0"E) गाँवों के पास स्थित हैं। इन बैंडों से एकत्र नमूनों में निश्चित कार्बन के न्यूनतम और अधिकतम मान क्रमशः 2.05% और 10.64% हैं।

आर्थिक रुचि के ग्रेफाइट क्षेत्र का पता लगाने के लिए कुल 269 बेड रॉक नमूनों और कोर नमूनों का विश्लेषण किया गया। जोन ए के लिए 0.120 मिलियन टन और जोन बी के लिए 0.056 मिलियन टन का कुल संसाधन अनुमानित किया गया।

RECONNAISSANCE SURVEY (G-4 STAGE) FOR GRAPHITE IN KANAPULISI BLOCK, RAYAGADA, ODISHA

CHAPTER-1 SUMMARY

Reconnaissance survey (G-4 stage) was carried out for graphite in Kanapulisi block of Rayagada district in Odisha, under F.No. 23/412/2023-NMET/390. The area belongs to the western khondalite zone of Eastern Ghats Mobile Belt. An area of 98.30 sq km constituting the southern part of 65 M/11 was mapped on 1:12,500 scale to decipher graphite occurrences. 100 nos. of bed rock samples were collected for ascertaining the grade of graphite on surface, 4.6 line km of SP survey and 100 cubic meters of trenching was completed for finding the extension of graphite zone and 500 meter of drilling to study the mineralisation in subsurface and resource estimation, if possible.

Charnockite, granite gneiss, khondalite, leptynite, calc-granulite and basic granulite are the major lithological units. Most of the rocks are foliated with general trend of foliation - NNW-SSE with 45° dip towards south-west. Mineral assemblages i.e. sillimanite-garnet-orthoclase-plagioclase-quartz, orthopyroxene-clinopyroxene-plagioclase and quartz-plagioclase-pyroxene-garnet in the rocks are indicative of granulite facies of metamorphism.

Graphite mineralizations encountered in this area are of disseminations and gneissose type. The small disseminated graphite flakes are generally found in khondalite and granite gneiss, oriented parallel to the foliation.

Major graphite bands with encouraging analytical results are located near Kodabata (19°20'39.0"N, 83°36'14.0"E), Tala Barangapadar (19°20'27.0"N, 83°36'51.0"E) and Alubarhi (19°19'45.0"N, 83°38'09.0"E) villages. The minimum and maximum values of fixed carbon in the samples collected from these bands are 2.05% and 10.64% respectively.

In total 269 numbers of bed rock samples and core samples were analysed to trace the graphite zone of economic interest. A total resource of 0.120 million tonne was estimated for zone A and 0.056 million tonne for zone B.

CHAPTER-2

INTRODUCTION

Graphite, also known as black lead or soft carbon, is a stable form of naturally occurring carbon. Structurally graphite is known to crystallize in hexagonal system and occurs in layered and lamellar form with grey to black metallic luster and a greasy feel. It has low hardness of 1.5 to 2.5 and specific gravity of 2.1. Natural graphite is categorized into two commercial varieties – crystalline graphite and flaky graphite. As per NMI database, based on UNFC system total resource/ resources of graphite in India as on 01.04.2020 were placed at about 211.62 million tonnes, out of that 8.56 million tonnes are reserve categories and 203.6 million tonnes are placed in Remaining Resources category. Arunachal Pradesh accounts for 36% resources followed by Jammu and Kashmir (29%), Jharkhand (9%), Odisha (9%), Madhya pradesh (5%), Tamil Nadu (4%). Production of graphite at about 30168 tonnes in 2020-21 decreased by 13% as compared to that in the preceding year. Odisha was leading producer contributing 42% of the total output during 2020-21. Graphite is listed as critical mineral in the list of 30 critical minerals for India issued by ministry of Mines in June, 2023.

In pursuance of NMET-mineral exploration project F. No. 23/412/2023-NMET/390, reconnaissance Survey (G4 Stage) for graphite was carried out by the team of geologist of Maheshwari Mining Private Limited in parts of Rayagada district falling in toposheet No. 65M/11 between 15.12.2023 and 01.05.2025. An area of 98.30 sq. km was mapped on 1:12500 scale, 100 nos. of bed rock samples were collected to ascertaining the grade of graphite, 4.6 line km of SP survey and 100 cubic meters of trenching were completed to find the extension of graphite mineralization.

2.1. Acknowledgement

During the project, constant support from Mr. Sanjeev Ganeriwala, Joint Managing Director of Maheshwari Mining Private Limited, is gratefully acknowledged. I also extend my thanks to Maheshwari Mining Private Limited for providing necessary resources and environment to carry out the work.

The authors express their sincere gratitude to National Mineral Exploration Trust, Ministry of mines, Government of India for approving the project and funding it. The Directorate of Geology and mining (DGM, Odisha and DGM Koraput) is thankfully acknowledged for monitoring the programme.

Support from the District Collectorate Office (Rayagada, Odisha), Divisonal Forest Office (Rayagada, Odisha), SP office (Rayagada, Odisha), Tahsil office (Bissamcuttack, Odisha), Range office (Muniguda, Odisha), concerned RI offices and local police station (Bissamcuttack, Odisha) are being thankfully acknowledged.

2.2. Details of the project

The project was approved by National Mineral Exploration Trust under F.No. 23/412/2023-NMET/390 for reconnaissance survey (G4 stage) for graphite in Kanapulis graphite block in Rayagada district of Odisha.

2.3. Investigating agency

Maheshwari Mining Private Limited conducted this exploration program under F.No. 23/412/2023-NMET/390 which was approved by NMET on 15th December, 2023.

2.4. Objectives of investigation

The primary objectives of the project are as follows:

- Geological Mapping of graphite-bearing outcrops and associated lithological units:

This objective involves conducting detailed geological mapping of graphite-bearing outcrops and related lithological units on 1:12,500 scale. The goal is to identify and delineate mappable rock types and to study the distribution of graphite zones in the study area, including their relationship with host rocks.

- Assessment of graphite resources and grade at G4 stage of exploration:

At this stage of investigation (G4), the aim is to assess the tentative resource and grade of graphite bands. This involves estimation of graphite resource in the identified areas based on geological mapping, drilling and sampling. The grade assessment includes determining the quality and composition of the graphite through proximate analysis (including fixed carbon content, ash content, sulfur content, volatile matter and moisture content), along with the analysis of 14 elements through ICP-MS.

- Delineation of potential blocks for upgrading to G3 stage:

This objective seeks to identify geologically and geochemically promising areas or blocks within the study region for further exploration and advancement to the G3 stage. This involves evaluating the potential of the identified blocks to warrant detailed investigation and resource evaluation at a more advanced exploration stage.

2.5. Basis for taking up investigation

B.C Achariya and B. Dash (1984) confirmed the occurrence of graphite in Rayagada district. Occurrence of graphite was also reported by J.K Nanda and U.C. Pati (1988-89) in the area. Mohanty and Pattanaik (1989-1990) described location wise (Durgi, Barangapadar, Rangamati and Kanapilisi) graphite mineralization together with fixed carbon content (4.5% to 46.3%) which are adjacent or within the area of the block. Based on the above information the team of geologists of Maheshwari Mining Private Limited planned geological traverses and collected grab samples from different locations. After chemical analyses most of the samples show encouraging FC content.

2.6. Nature and quantum of work:-

| Table no. 2.A: Nature and quantum of work | | | | |
|--|---|--------------------|-------------------------|-------------------------|
| Sl. no | Item of work | Unit | Quantum approved | Quantum achieved |
| 1 | Geological mapping (on 1:12500) | Sq. Km | 98.3 | 98.3 |
| 2 | Geochemical sampling (Bedrock sampling) | Nos. | 100 | 100 |
| 3 | Magnetic survey | Points | 300 | 300 |
| 4 | SP survey | L.km | 4.5 | 4.5 |
| 6 | Trenching | Cubic meter | 100 | 100 |
| 7 | Drilling (6 number of borehole) | Meter | 500 | 500 |
| 8 | Proximate analysis for graphite | Nos. | 330 | 269 |
| 9 | Proximate analysis for graphite 10% external check | Nos. | 33 | 24 |
| 10 | Analysis for associated REE + Vanadium (ICPMS 14 elements) | Nos. | 150 | 155 |
| 11 | Petrochemical studies (pcs) | Nos. | 10 | 10 |
| 12 | Petrographic studies | Nos. | 10 | 10 |
| 13 | Preparation of thin sections | Nos. | 10 | 10 |
| 14 | Study of thin section | Nos. | 10 | 10 |
| 15 | Bulk density/ specific gravity determination | Nos. | 5 | 5 |
| 16 | Drill core preservation | Meter | 200 | 253 |

2.7. Personnel involved

| Table 2.B: list of the personnel involved | |
|--|---|
| Responsibility assigned | Personnel of MMPL involved |
| President & CEO (Exploration) | Mr. Ambika Prasad Samantaray, President and CEO, MMPL |
| Advisor Geology | Mr. Pradipta Tarafdar |
| Overall Co-ordination | Mr. Sourabh Sarkar, DGM, MMPL |
| Geological Report Preparation & Documentation | Mr. Tushar Kant Giri, Geologist, MMPL |
| | Mr. Rupan Roy, Geologist, MMPL |
| Field Geologist | Mr. Rupan Roy, Geologist, MMPL |
| | Mr. Biswajit Kundu, Geologist, MMPL |
| | Mr. Tushar Kant Giri, Geologist, MMPL |
| Office Geologist | Ms. Anusrita Thakur, Manager Geology, MMPL |
| | Mr. Balkrishnan Viswakarma, Manager Geology, MMPL |
| | Mr. Promit Roy, Geologist, MMPL, |
| Petrographic study | Ms. Medha Sarkar, Geologist, MMPL |
| Field Co-ordinator | Mr. Rupan Roy, Geologist, MMPL |
| SURPAC Modeling | Ms. Moulipriya Bhakta, Deputy Manager Geology, MMPL |
| Field Geophysicist | Mr. Abhishek Deori, Geophysicist, MMPL |
| | Mr. Manas Pritam Pukhan, Geophysicist, MMPL |
| Office Geophysicist | Dr. Suvendu Mondal, DGM, MMPL |
| DGPS Survey | Mr. Pintu Roy, Surveyor, MMPL |
| Drilling co-ordinator | Mr. Sujan Karmakar |
| Draftsman | Ms. Gargi Roychowdhury |
| Technical Support | Mr. Sudipta Bhowmik , IT specialist and Admin, MMPL |
| ArcGIS and Autocad | Mr. Rupan Roy, Geologist, MMPL |
| | Mr. Biswajit Kundu, Geologist, MMPL |
| | Mr. Tushar Kant Giri, Geologist, MMPL |

2.8. Mode of operation of different work component and associated agencies:-

Large Scale Mapping (Reconnaissance survey) on 1:12,500 scale, surface & sub-surface sampling (BRS and core sampling), petrographic studies, geophysical survey, pitting and trenching, DGPS survey, sub-surface exploration (drilling) work were conducted by the in-house strength of Maheshwari Mining Private Limited. Geochemical analyses (Proximate analysis of graphite and analysis of 14 elements by ICPMS and determination of proximate analysis of core samples and bulk density were carried out by NMCI Shree Coal Laboratory. Check sample analysis was done by Shiva Analyticals (India) Private Limited.

CHAPTER-3

PROPERTY DESCRIPTION

3.1. Village, district and state details

The area of investigation is part of the Rayagada district, Odisha. The main localities are Kodabata, Durgi, Tala Barangapadar, Alubarhi, Kanapulisi, Palupai, Birubai, Sundidhamini etc.

3.2. Concerned toposheet

The area of investigation forms southern part of the survey of India toposheet no. **65M/11** (Fig.2.1).

3.3. Geo-coordinates of the corner points of the investigated area

| Table 3.A: Geo-coordinates of the corner points of the investigated area | | |
|---|-----------------|------------------|
| Point corners | Latitude | Longitude |
| A | 19°21'00"N | 83°35'00"E |
| B | 19°21'00"N | 83°40'00"E |
| C | 19°15'00"N | 83°40'00"E |
| D | 19°15'00"N | 83°35'00"E |

3.4. Land use/cover

The designated areas land cover includes high hill ranges in the northeastern, western and southern side together with agricultural lands, nalas and forest lands. Chengili, Debala, Kanapulisi, Robarhi & Kondajamu are the forest area in block.

3.5. Forest type

The northern, western, southern as well as the northeastern parts of the area is densely covered with vegetation, which can be classified under tropical dry, deciduous and mixed forests.

3.6. Free hold details

The total area is free hold.

3.7. Location

Geographically the area falls in to the Rayagada district of Odisha (Fig.2.2 and Fig.2.3). The area, enclosed between latitudes: 19°15'00"N-19°21'00"N and longitude: 83°35'00"E-83°40'00"E, situated in the southern part of toposheet No. 65 M/11 (Fig.2.1).

Geologically the area belongs to the western khondalite zone of Eastern Ghats Mobile

Belt (Fig.2.4). According to the classification of graphite zone of Odisha, it falls in part of southern graphite zone occurring in the south-western side of Tumudibandh shear belt.

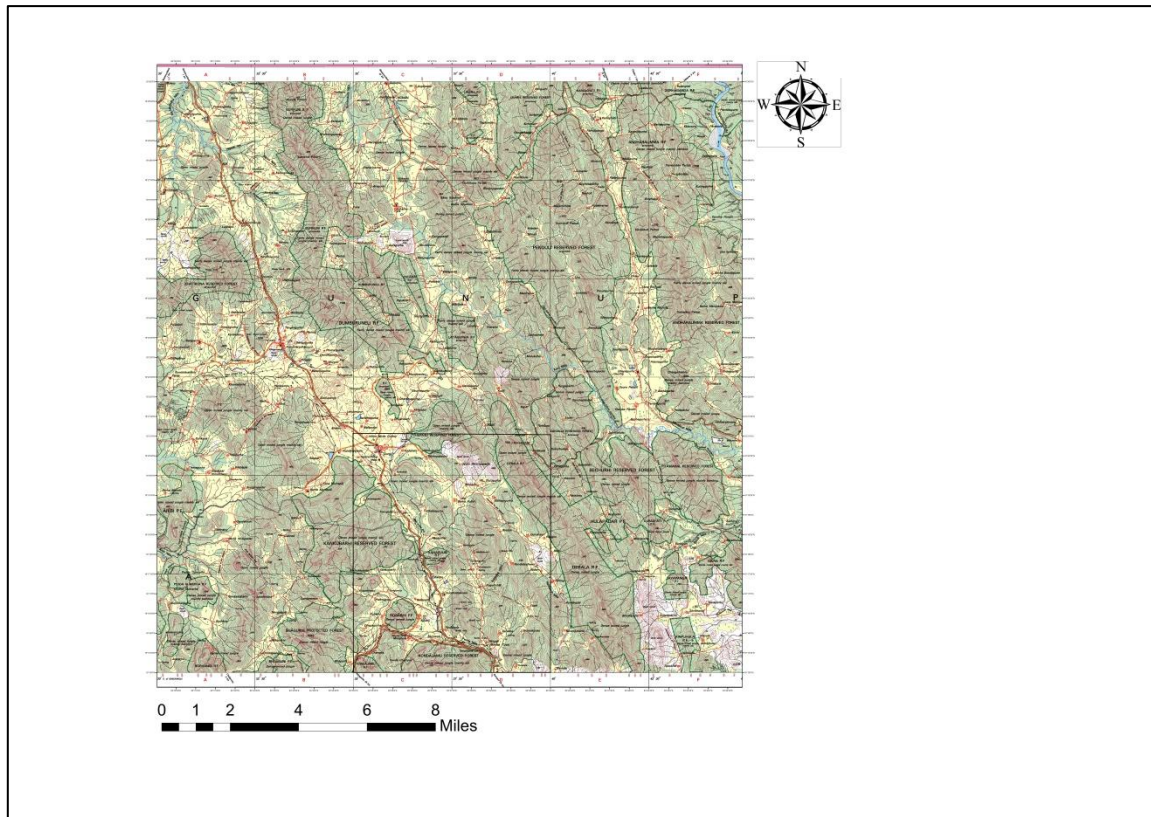


Fig.2.1. Block Boundary on Survey of India Toposheet Number 65M/11

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3.8. Accessibility

The area is well connected by a network of rail and road. Bissamcuttack, Muniguda and Rayagada are the nearby railway stations. The state highway SH-46 is connecting the area to the NH-326.

3.9. Climate and vegetation

The region experiences a humid tropical climate, with summer temperatures soaring as high as 48°C. The rainy season begins in mid-June and lasts until the end of October with an average annual rainfall of about 120 cm. Winter is characterized by cooler, pleasant temperatures. The region's hill slopes are primarily covered by tropical forests, which thrive on khondalite soil due to its susceptibility to weathering. The forests are rich in deciduous species such as sal, tamarind, mahul and bamboo. In the lower slopes, the vegetation includes economically valuable plants like eucalyptus, jackfruit, kendu, mango banana and pineapple. The fertile soils of the plains are used for cultivating crops like paddy, wheat and pulses. Cashew and cotton commonly grow along the hill slopes and in the valley areas. Additionally, the region is dotted with bushes of *Chromolaena odorata*, a plant whose chemical composition has an affinity for carbon.

3.10. Flora and fauna

The common flora include Mahua (*Madhuka latifolia*), Mango (*Mangifera indica*), Tamarind (*Tamarindus indica*), and Bamboo (*Bambusa vulgaris*), Jackfruit (*Artocarpus heterophyllus*), Kendu (*Diospyros melanoxylon*), Banana (*Musa paradisiacal linn*) etc.

The common fauna include Chameleon (*Chamaeleo chamaeleon*), Gliding snake, Mongoose, Peacock, Wild buffalo, Snakes etc.

3.11. Geomorphology

The area is predominantly rugged with an average elevation of 400 meters and hills that rise up to 900 meters above sea level. Most of the area is covered by a chain of hills and mounds. The drainage pattern follows a dendritic layout with two perennial nala-the Pedda Nala, flowing from northwest to south and the Balandeli Nala, flowing from north to south.

The general slope, as indicated by the drainage pattern, is from the northern to the southern side of the region. The alignment of the hill ranges and the drainage system is primarily influenced by the underlying lithology and structure. The higher elevations are dominated by khondalite, while other lithological units are found at lower altitudes.

3.12. Local infrastructure

The region, part of the Eastern Ghats Mobile Belt, features an undulating topography marked by high hill ranges, valleys and nala sections, interspersed with agricultural land. Several villages, including Alubarhi, Durgi, Kodabata, Kanapulisi, Tala Balangapadar, Kurankul and Rugurhibai are situated within this landscape. Despite the challenging terrain, the area is well-connected by metalled roads and villages are supplied with electric power for domestic use.

3.13. Environment

Rayagada district was established in 1992, following the division of the erstwhile Koraput district into four new districts. Geographically, Rayagada is situated in southwestern Odisha, spanning 7,073 square kilometers between latitudes 18°54' to 20°00' and longitudes 82°54' to 82°02'. Approximately 94% of the district population resides in rural areas, relying heavily on irrigation for their livelihood. The industrial sector of the district is supported by abundance of minerals, including graphite, manganese, bauxite, china clay, limestone, quartz, and gemstones.

The economy of Rayagada district is primarily driven by three key sectors: industry, agriculture and tourism. Agriculture and industry form the backbone of the district economy. Tourism industry of Raygada showcases the rich natural and cultural heritage. Rayagada district, established in 1992, covers 7,073 sq km in southwestern Odisha. Agriculture and industry are the economic backbone. Tourism of Raygada highlights its natural and cultural heritage.

CHAPTER-4

PREVIOUS WORK

- ❖ Parts of the area and the surroundings were covered by systematic geological mapping earlier by Dey (GSI, 1940-41), Dey and Chakraborty (GSI, 1944-45) and Muktinath (GSI, 1941-42). Then, Chaudhury and Acharya (GSI, 1977-78), Malviya and Mathur (GSI, 1980-81) and Dasgupta (GSI, 1981-82) have studied parts of it and gave a general geological account of the area comprising field relationships and basic petrography of the lithological units. They have grouped the lithological units under Eastern Ghats Super Group (Complex).
- ❖ Officers of the Directorate of Geology, Odisha first reported graphite occurrences around Sollagudi, Naringapanga, Khallupadar, Mudra, Bongna, Berli and Sabinala villages of Rayagada district in 1982-83. Preliminary investigation was carried out and found graphite occurrences under thick soil cover with analysis of FC% varying up to 49%. It was observed that graphite occurrences are found within the migmatized khondalite. The ore bodies show concordant relationship with the host rock.
- ❖ In 1983-84, Directorate of Geology, Odisha carried out mapping and found seven graphite occurrences in nearby areas of Naringapanaga village. The F.C % varying from 4.56 to 21.38%.
- ❖ In recent years, J.K Nanda and U.C. Pati (GSI, 1988-89), reported occurrences of pelitic and psammopelitic meta-sedimentaries with or without graphite in the area along with charnockite and granite suit of rocks.
- ❖ Dr. S. Pasayat and K. N. Adhikari (GSI, 1988) reported occurrences of graphite in different villages of Rayagada district.

CHAPTER-5

GEOLOGY OF THE AREA

5.1. Regional geology

The rugged country with discontinuous hill ranges occurring along the coast of the Bay of Bengal is known as the Eastern Ghats. The average altitude is 610 m and the tallest peak Mahendragiri is 1501 m high. The highly deformed rocks that experienced ultrahigh-temperature granulite facies metamorphism and several generations of magmas of varied compositional types are recognized as the **Eastern Ghats Mobile Belt (EGMB)** which is extending from Brahmani River in Odisha to Ongole in south-eastern Andhra Pradesh. The 1000-km-long terrain is nearly 300 km wide in the northern part (Mahalik 1996), but tapers to merely 30 km in the south, the average width being 100 km. The Gondwana in two Phanerozoic rift valleys, the Mahanadi Graben in the north and the Godavari Graben in the south, break the continuity. It is a Mesoproterozoic terrain that has a very long history of tectono-thermal evolution including migmatization and charnockitization of supra-crustal rocks.

The EGMB was referred to as a convergent orogeny that evolved under NW–SE-directed sub horizontal compression resulting from oblique collision of continental plates (Chetty and Murthy 1994; Ramakrishnan et al. 1998; Bhattacharya 2002). Gravity modelling constrained by seismic information suggests that the eastward-inclined 38 to 40km-thick column of cratonic crust lies 35 km below this mobile belt (Kumar et al. 2004). It will be apparent that the EGMB displays high-gravity anomaly compared to the cratons, implying denser rocks underlying it (Subramanyam and Verma 1986). Building the bulk of the EGMB, the exposed charnockite–khondalite succession represents the thrust-up lower crustal material. The basement archaean rocks are seen nowhere, but the material forming them occurs in the framework of the mobile belt in a drastically remobilized and reconstituted forms.

Four lithological zones (Fig.2.4) were recognized in the EGMB on the basis of ages of protoliths and constituent minerals (Ramakrishnan et al. 1998). The fifth unit is the zone of transition. The brief descriptions are as follow-

The **Western Charnockite Zone** comprises dominant charnockites and enderbites with lenses of basic and ultrabasic rocks and minor intercalations of metapelite (khondalite) and basic granulites. There are several generations of charnockites, the oldest being deformed and gneissose, garnet bearing and concordant in disposition with the khondalite.

The **Western Khondalite Zone** is dominated by metapelitic khondalite with intercalations of quartzite, calc silicate gneiss, marble and minor though very significant high Mg–Al granulite characterized by sapphirine. Intrusive bodies of charnockites and massif-type anorthosite, as seen at Bolangir, Turrkel and Jugsaipatna are also present. Metamorphosed basic sills and lava flows are represented by concordant bodies of basic granulites within the khondalite succession. In many cases, there are plutonic intrusives.

The Central Migmatite Zone is made up of dominant migmatites, garnet-bearing diatexites with leptynites, high Mg–Al granulite and calc silicate rock intruded by charnockites and porphyritic granites. There are bodies of massif-type anorthosite within the zone. The migmatites owe their origin to high-grade metamorphism with differential melting of siliceous granulites, like the khondalite. The charnockites also show a composition that reveals affinity to tholeiitic to calc-alkaline basalts of the protoliths (Rao et al. 1995). There are patches of charnockite developed incipiently on the granulitic gneisses and migmatites. They were supposed to have formed as a result of activity of CO₂-rich fluids and/or through a process of charnockitization of metasediments of appropriate bulk composition (Nanda and Pati 1989; Paul et al. 1990; Rajesham et al. 1992; Mohan et al. 2003).

The **Eastern Khondalite Zone** consists of a lithology not different from that of the Western Khondalite Zone, but is devoid of anorthosite bodies. The leptynites that are interlayered with khondalites in the Chilka Lake area represent the granitoids produced by dehydration melting in the metapelites of different composition (Sen and Bhattacharya 1997). The presence of sillimanite trails within garnets suggests that the khondalites were indeed subjected to partial melting. In the Rengali domain in the northern part of the EGMB, the multiple shear zones seem to have not only served as places for intrusion of alkaline rocks but also provided pathways to fluids that brought about charnockitization and migmatization of granulitic rocks (Mahalik 1994). Understandably, the ultrabasic intrusives occur as boundinaged bodies in the highly deformed masses of khondalites of shear zones. Closely associated in space, the co-magmatic anorthosite occurs as metamorphosed and tectonized layers in the EGMB.

Transition Zone is present on the western and south-western margins of the EGMB. It consists of a mixture of litho-types belonging to the craton and the Western Charnockite Zone. The granulites show retrogression to amphibolite facies of metamorphism along the shear zone.

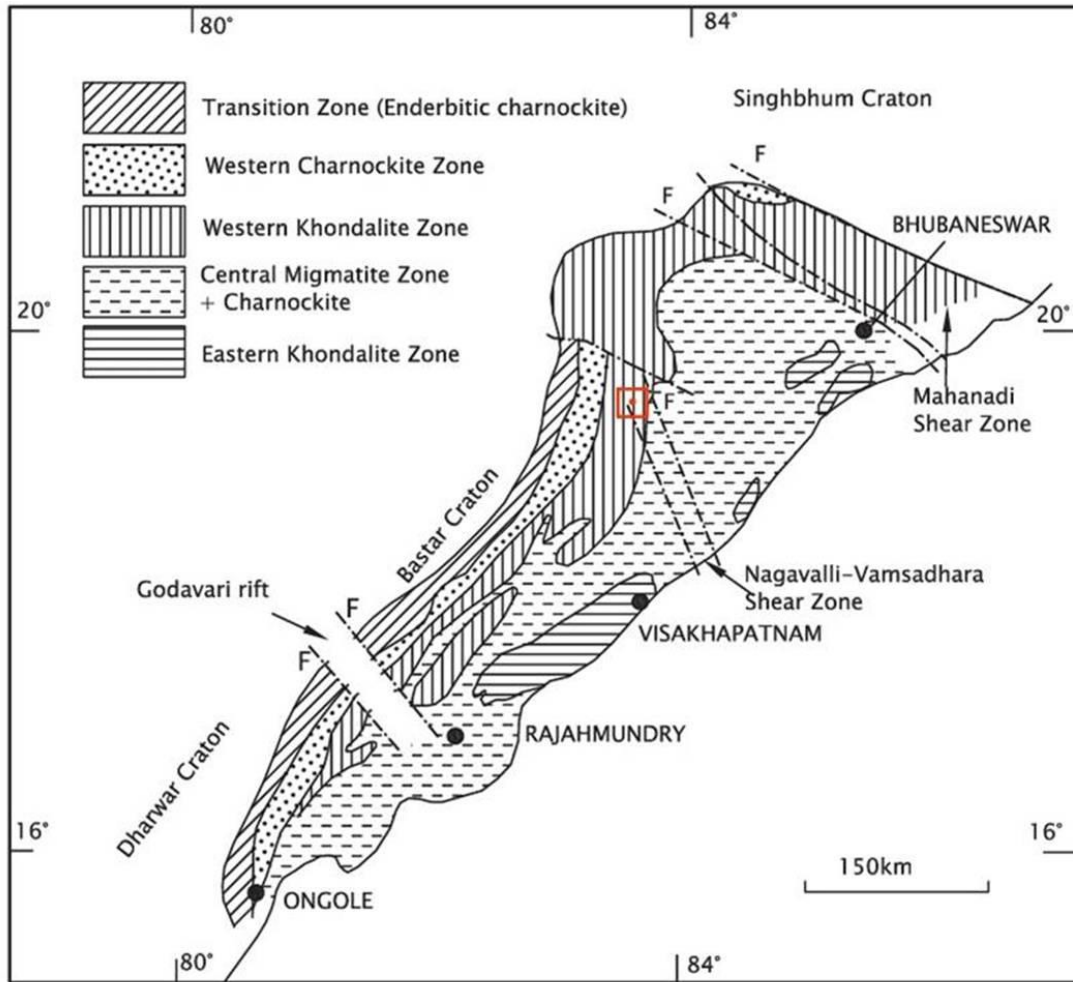


Fig.2.4. Location of the study area on map of Eastern Ghats Mobile Belt (Ramkrishna et al. 1998; Dasgupta and Sengupta 2002; Biswal and Sinha 2003)

5.2 Stratigraphic Column

On the basis of different geological investigation and evidences tentative stratigraphic column (Table 5-A) was proposed by Ramakrishnan et al., (1994).

| Table 5-A: Stratigraphic Sequence of Eastern Ghats [Ramakrishnan et al., (1994)] | |
|---|--|
| Age | Lithological Units |
| 800-900 Ma | Alkaline rocks, granitoids |
| 1000-1100 Ma | -----Eastern Ghats orogeny----- |
| | Development of eastern Ghats front of upgraded cratonic rocks. |
| | Incipient and massive charnockite and garnetiferous gneiss with biotite and sillimanite |
| 1300-1400 Ma | Emplacement of alkaline rocks (Feldspathoid gneiss and anorthosite) |
| Khondalite Group (WKZ, CMZ, EKZ) | Garnet-sillimanite-Quartz-feldspathic graphite gneiss |
| | Cordierite-sapphirine-spinel rocks |
| | Calc silicate rocks and rare marbles |
| | Quartzite rich in garnet |
| 1600-1800 Ma (WCZ) | Evolution of purana basin |
| 2600-2800 Ma | Charnockite with enclaves of basic granulite, high grade schists including BIF and layered basic complexes, representing original cratonic basement (?) in migmatitic amphibolite facies |
| 3000 Ma | Vestigial events (?) |

5.3 Structure

The Eastern Ghats in the Peninsular India trends NE-SW and form detached hill ranges that stretch from Cuttack to the Nilgiris. Presently, the Eastern Ghats Mobile Belt is considered to extend from Bramhani river in Odisha to Ongole in Andhra Pradesh for over 900 kilometres and is distinguished from the southern granulite terrain by differences in lithological polarity, presence of manganese, marble, the ubiquitous garnetiferous gneiss,

structural alignment and age (Ramakrishnan, 1988), The Odisha sector forms the northern extreme of Eastern Ghats Mobile Belt, and has a maximum width of about 300 kilometers, which gradually tapers down further south in Andhra Pradesh. The Eastern Ghats Complex in Odisha comprises dominantly metasediments like khondalite, quartzite, acid gneiss and calc-silicate granulite intimately associated with basic granulite (two pyroxene charnockite, porphyroblastic acid gneiss and leptynite)

More or less these rock types form banded assemblage and are permeated by quartz-feldspar neosomes and pegmatites giving rise to migmatites depicting palaeosome-neosome mixtures of different degrees at different places which is typical of migmatite complex of Eastern Ghats (Halden et al., 1982).

These lithological layering exhibit complex structural patterns. Parallel bands are more or less foliated. Graphite in Eastern Ghats Complex of Odisha rock units are oriented diversely as a four successive fold phases, (viz. isoclinal to tight intrafolial fold (F1); asymmetrical to isoclinal, intrafolial folds (F2); open folds (F3) and warp folds (F4). The trend of major lithological units exhibit NE-SW to NNE-SSW in western and southern parts of Odisha but in eastern part the trends of major lithological units are NNW-SSE to NW-SE. Metamorphism of these litho-units has taken place dominantly under granulite facies conditions, followed by granitisation and retrograde metamorphism (Acharya, 1990).

5.4 Metamorphism

The lithological units of the EGMB consist of the following mineral assemblages:

- Garnet-sillimanite-perthite-plagioclase-quartz \pm graphite (khondalite)
- Garnet-plagioclase-perthite-quartz (leptynite)
- Wollastonite-scapolite-plagioclase-garnet-calcite-clinopyroxene-sphene (Calc-silicate granulite)
- Orthopyroxene-clinopyroxene-plagioclase \pm garnet (basic granulite)
- Sapphirine-spinel-orthopyroxene-garnet-quartz/corundum-cordierite-sillimanite
- (high-magnesian-aluminium granulite)
- Orthopyroxene-plagioclase-quartz-perthite (enderbite-charnockite)

The study of chemistry of these mineral assemblages together with interpretation of textural features of constituent grains brings out a coherent picture of thermal history of the terrain. Metamorphism reached the granulite facies (Temperatures 950–1040°C and pressures of 8 to 10 kbar), followed by isobaric cooling (under equal pressure) and decompression. Three phases of metamorphism were recognized—(i) early ultrahigh-temperature metamorphism with anticlockwise P–T path, (ii) granulite facies reconstitution with retrograde trajectory of near isothermal decompression and (iii) amphibolite facies metamorphism (Dasgupta 1995; Dasgupta and Sengupta 2002).

The early-stage ultrahigh-temperature metamorphism at temperatures higher than 1000

°C and under pressures of 8–10 kbar representing the peak of the processes was witnessed by, among other areas, Vijaynagaram (Sarkar et al. 2003) and Chilka Lake (Bhattacharya 2004). The high Mg–Al granulite of Visakhapatnam district was formed at temperatures 930–740 °C under pressure of 8.5–5.9 Kbar (Lal 1997; Lal et al. 1987; Dasgupta and Sengupta 2002). The orthopyroxene-bearing enderbite rocks associated with basic granulites in the northern part of the terrain was affected by metamorphism at temperatures in excess of 950 °C and under pressure of 8–9 kbar. The elevated temperature is attributed to emplacement of basic magma (Bose et al. 2003). There was dehydration melting in the Chilka Lake area (Sen and Bhattacharya 1997). The Gangarajumuduguli charnockites were formed under anhydrous condition generated by influx of CO₂-rich fluids into rocks of lower crustal level where the temperature was 860 °C and pressure of 9 kbar (Mohan et al. 2003). As a matter of fact, ultrahigh-temperature condition prevailed practically all over the Eastern Ghats Terrain when thermal perturbation occurred on a lithospheric scale. The cause of exceptionally high heating was the under-plating or intra-plating of hot basic magma (Dasgupta and Sengupta 2002). The ultrahigh-temperature events were followed by retrograde metamorphism at temperatures 750–800 °C under pressures 6–7 kbar, as deduced from the composition of orthopyroxenes and the coronal garnet which have rims of spinel against quartz (Sarkar et al. 2003). From relict kyanites, a clockwise path with decompression followed by isobaric cooling is witnessed in the Deobhog area (Patel et al. 2001). The mineral assemblages of khondalites and associated feldspathic gneisses and porphyritic charnockites of the Araku–Paderu sector indicate a temperature of 750 ± 50 °C and pressure 7.5 ± 0.5 kbar (Divakara Rao and Murthy 1998). The megacrystic granite widely distributed in the Central Khondalite Zone. Eastern Migmatite–Charnockite zone is characterized by higher strontium ratio (0.7172), negative correlation of Ba, Sr and Zr and positive correlation of REE, than Rb with SiO₂. The chemistry betrays their deep-seated origin through melting of the crust at 850°–1000 °C under pressure of 9 kbar (Divakara Rao et al. 2001).

CHAPTER-6

GEOSCIENCE INVESTIGATION

6.1 Geological mapping

6.1.1 Large scale geological mapping on 1:12500 scale

An area of 98.30 sq km was covered through Large Scale Mapping on 1:12,500 scale, in and around Alubarhi, Durgi, Kodabata, Kanapulisi, Tala Balangapadar, Kurankul, Rugurhibai etc. for the investigation of graphite. The area of present investigation falls in southern parts (Fig.2.1) of Survey of India toposheet no. 65 M/11 bounded by latitudes: 19°15'00"N-19°21'00"N and longitude: 83°35'00"E-83°40'00"E, under Rayagada District of Odisha.

6.1.2 Outcrop map on 1:12500 Scale

The outcrop map (Plate-I) of the proposed area consists of mappable lithological units of charnockite, granite gneiss, khondalite, leptynite and calc-silicate gneiss. The khondalite occurs along the higher altitude where as other lithological units are restricted to the hill slopes and valley portions.

6.1.3 Description of the lithological units

Charnockite

This is the dominant lithology of the area. Large continuous domal shaped exposures of charnockite (Fig.6.1) are well exposed in central, eastern and south western parts; small outcrops of charnockite are also encountered in the north western and western part of the area.

Charnockite is a medium to coarse grained greasy looking rock that is typically greenish grey to dark grey in colour. It is composed of plagioclase, quartz, prismatic pyroxene and occasionally garnet. The rock is very hard, compact and massive in nature. In some locations charnockite suffer some sort of migmatization evidenced by formation of well developed flow folding.

Granite gneiss

Granite gneiss (Fig.6.2) is extensively exposed in the northwestern, western, and southeastern parts of the study area. This rock is characterized by pinkish white color and is primarily composed of quartz, feldspar, biotite and garnet. The gneissosity is well-developed with distinct layering: light-colored bands rich in quartz and feldspar, alternate with darker layers dominated by biotite. In certain areas, larger augen-shaped porphyroblasts of quartz and feldspar are observed. The granite gneiss is foliated in nature, with a general trend NW-SE dipping towards southwest. Small graphite flakes occur in granite gneiss scattered in a disseminated form, aligned parallel to the foliation plane.

Khondalite

Khondalite (Fig.6.3) in the area is hard, highly weathered, foliated, and migmatized, occurring predominantly at high elevations in the northeastern, southern and western parts of the region. The khondalite exhibits gradational boundaries with the surrounding granite gneiss. The rock is leucocratic, ranging in color from reddish-brown to buff-red and is medium to coarse-grained consisting primarily of garnet, quartz, feldspar, and sillimanite with or without graphite. Some of the khondalite units display coarse garnet grains. The general strike of the lithounit ranges from N50°W to N30°W, with dips between 40° and 60° towards southwest.

Leptynite

Leptynite (Fig.6.4) occurs as small bodies within khondalite in areas near Palupai, Barhisola, Dhepagurha and Kalingaguda villages. The lithological units are light-colored and consist primarily of quartz, feldspar, staurolite, and garnet. A distinctive feature of the unit is the presence of well-developed quartz blades, which are oriented parallel to the foliation plane.

Calc granulite

Calc granulite (Fig.6.5) has limited distribution and occurs within the granite gneiss in the area. Calc- silicate granulite bodies are encountered in the southern part of Tenupulisi village and northwestern part of Rangamati village. The rock is fine grained, greenish white in colour composed of wollastonite, diopside, plagioclase and quartz; shows ridge and furrow structure due to differential weathering of alternate compositional banding.

Quartzite

A narrow band of quartzite (Fig.6.6) is located in the southwestern part of Palupai village, where it is associated with khondalite. The quartzite is brownish-white in colour, medium to fine grained, hard and compact composed predominantly of quartz with small proportions of garnet.

Basic Granulite

Basic granulite occurs as narrow bands within the granite gneiss near Bankili village. Patches of basic granulite occur within granite gneiss (Fig.6.7) and leptynite (Fig.6.8) in the northern part of chakrigurha village.



Fig. 6.1: Charnockite exposed near Rugurhibai village



Fig. 6.2: Granite gneiss near Puralima village



Fig. 6.3: Khondalite exposed North of Upara Barangapadar village



Fig. 6.4: Leptynite exposure near Barhisola village



Fig. 6.5: Calc granulite exposed North of Rangamati village



Fig. 6.6: Quartzite exposed South of Palupai village



Fig. 6.7: Granite gneiss contain patches of basic granulite near Bankili village



Fig. 6.8: Leptynite contain patches of basic granulite near Tala Barangapadar village

6.1.4 Petrographic studies

GENERAL:

Petrographic examination of thin sections of 10 borehole core samples of different lithologies distributed in the Kanapulisi Block, Odisha is aimed at elucidating the mineralogical and textural variations in the samples and establishing the various rocktypes present in the area and the rocks that hosts the graphite mineralization.

PETROGRAPHIC OBSERVATIONS:

Detailed petrographic observations from thin section analyses indicate that the Kanapulisi Block is predominantly composed of high-grade metamorphic and igneous lithologies i.e. charnockites, enderbites, khondalites, mafic granulites, and granite gneiss.

Among these rocks, khondalites and granite gneiss are the primary lithologies hosting graphite mineralization. Khondalites exhibit prominent gneissic structure, characterized by the dominant orientation and elongation of mineral grains. The graphite is studied under microscope and observed as both flaky and slightly amorphous in some places. The flakes are well- developed, and occasionally branch, seen under higher magnification. In some areas, it appears as mass of graphite flakes. Thin section studies reveal that the graphite is controlled by both lithology and structure.

Thin Section Petrographic Observations

Sample: KTBH-3/M-1

Rock Type: Khondalite

The thin section (Fig.6.9) reveals a quartzo-feldspathic metamorphic rock characterized by prismatic sillimanite, equant to elongated garnet grains, and a well-developed foliation. The mineral grains exhibit extensive fracturing, giving the rock a brecciated appearance. All grains, including quartz, feldspar, and garnet, show elongation and orientation along the primary foliation direction, indicating strong deformation.

Garnet, occurring as subhedral to anhedral grains, is isotropic under crossed polars (XPL) and prominently elongated along the foliation plane, suggesting syn-tectonic metamorphic growth. Sillimanite is distributed throughout the quartzo-feldspathic matrix, displaying well-defined grain boundaries. Under plane-polarized light (PPL), sillimanite appears colourless to light yellow, while in crossed polars, it exhibits high birefringence with characteristic higher-order pink and yellow interference colors and straight extinction.

A distinct feature observed in this sample is the presence of myrmekite, an intergrowth of quartz and plagioclase feldspar at grain boundaries. This texture signifies late-stage deformation and metasomatic processes, often associated with high-grade metamorphism and partial melting.

The rock exhibits alternate domains of quartz-rich and garnet-sillimanite-rich zones, reflecting compositional banding. The high degree of mineral alignment, deformation

features, and mineral assemblage confirm that this rock is khondalite, though with a finer grain size compared to previously examined khondalite samples.

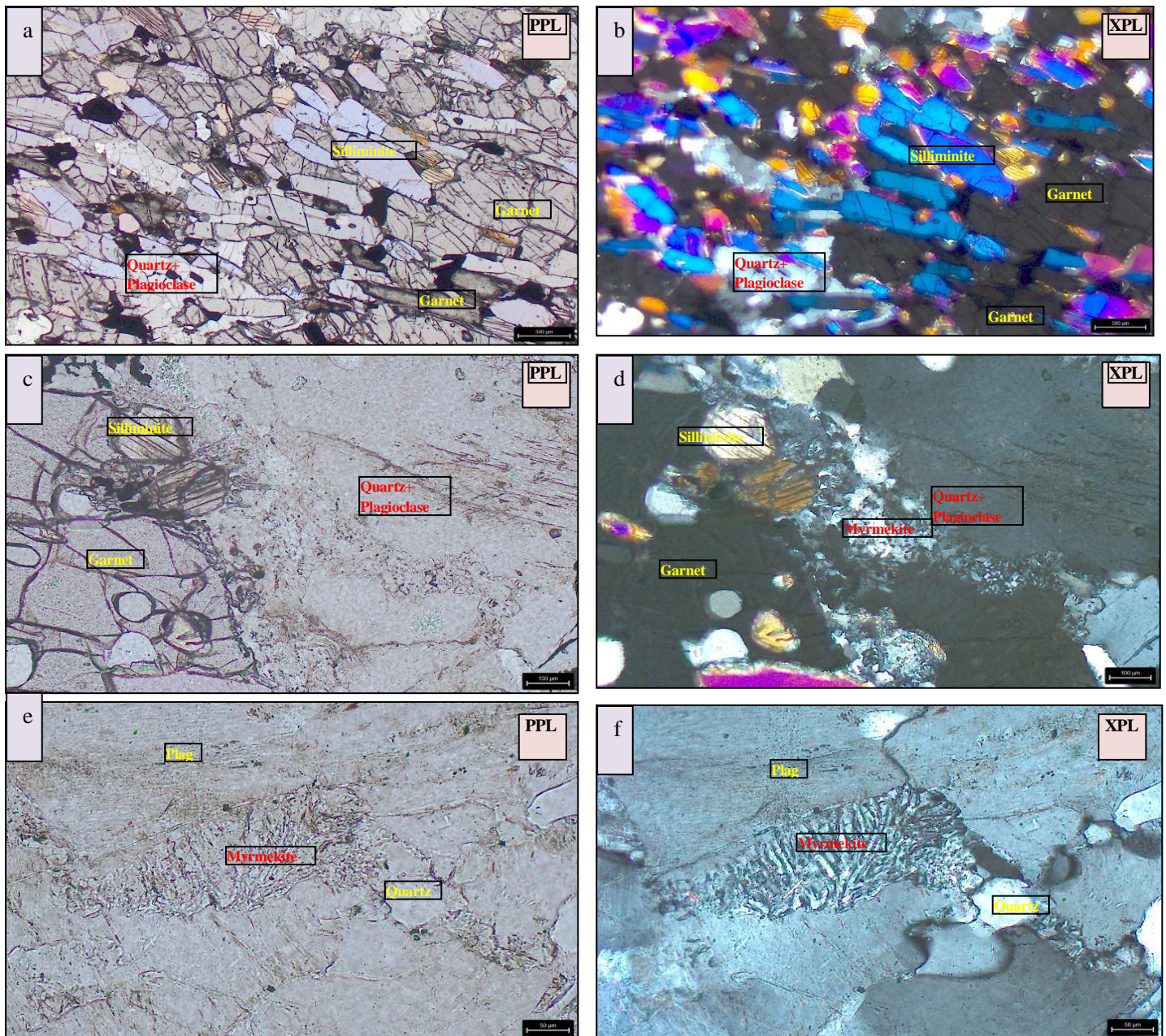


Figure 6.9: Photomicrograph of a,c,e – Khondalite under plane polarized light, b,d,f – Khondalite under crossed polarized light

Sample: KABH-2/M-2

Rock Type: Khondalite

The thin section (Fig.6.10) exhibits a coarse-grained quartzo-feldspathic rock with garnet and minor sillimanite as key metamorphic phases. Quartz grains are the dominant component, displaying a highly fractured nature and an elongated shape, indicative of deformation and recrystallization. The feldspar component is inter-grown with quartz, contributing to the overall granoblastic texture.

Garnet occurs as subhedral to anhedral grains, lacking significant elongation. It appears isotropic under crossed polars (XPL) and is scattered within the matrix without a preferred orientation. Sillimanite is present in lesser amounts, occurring as fine prismatic grains, often embedded within the quartz-feldspar groundmass. Under plane-polarized light (PPL), sillimanite exhibits a colorless to pale yellow body color, while under XPL, it displays high-order birefringence with straight extinction.

The overall mineral assemblage and structural fabric indicate that this sample represents khondalite, though with a higher proportion of coarse quartz and a relatively lower abundance of sillimanite compared to previously examined samples.

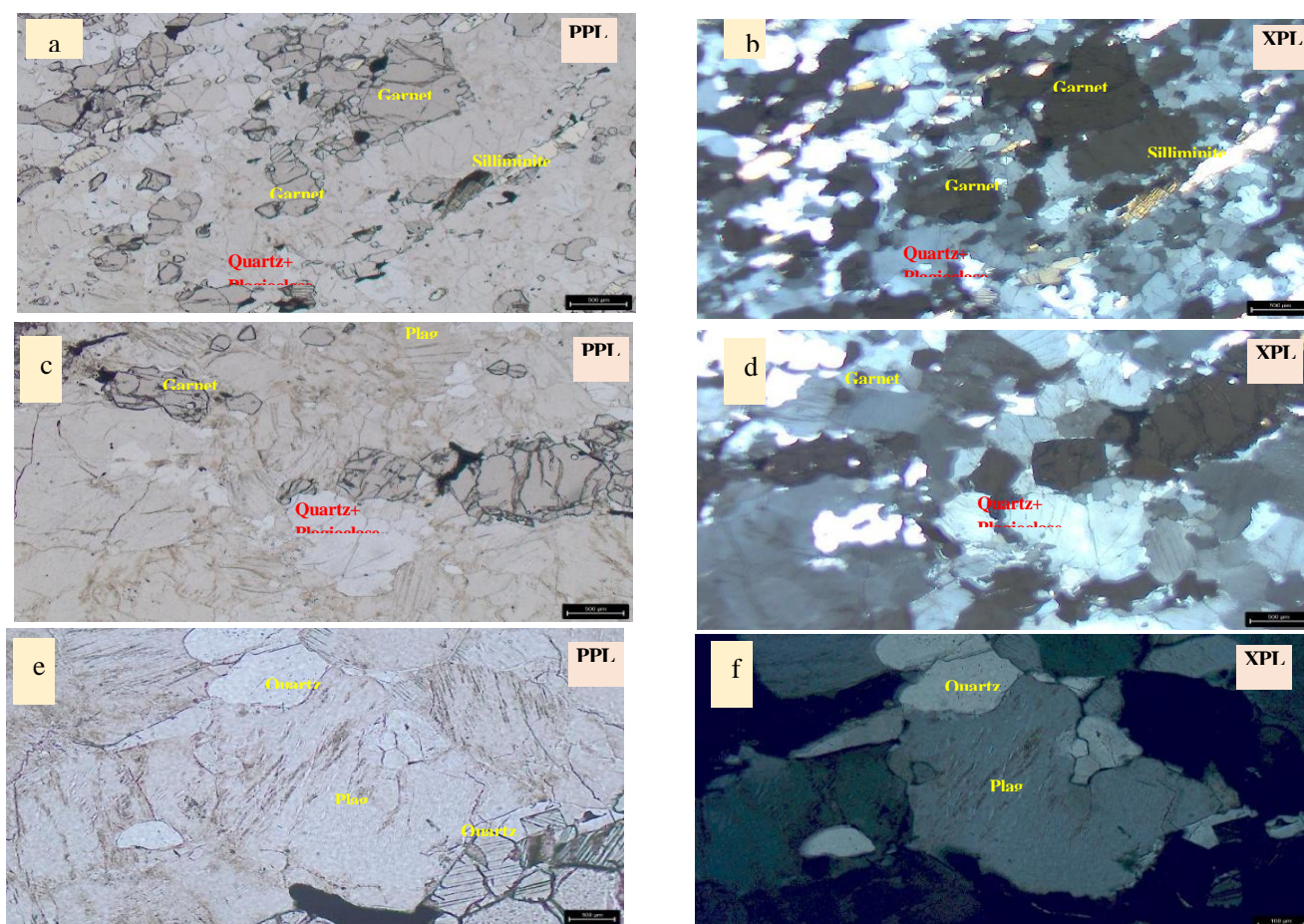


Figure 6.10: Photomicrograph of a,c,e – Khondalite under plane polarized light, b,d,f – Khondalite under crossed polarized light

Sample: KABH-1/M-34

Rock Type: Garnetiferous quartzite

The photomicrograph of the thin section (Fig.6.11) reveals a mineralogical composition dominated by quartz and garnet, with minor feldspar and sparse opaque minerals. Quartz grains exhibit a granoblastic texture with sutured grain boundaries and undulose extinction, indicative of post- metamorphic strain. Garnet occurs as subhedral to euhedral porphyroblasts, recognizable by its isotropic nature under crossed polars (XPL).

Feldspar, primarily plagioclase, is present in smaller amounts and displays parallel twinning under cross polar. Opaque minerals, likely magnetite or ilmenite, appear as minor constituents, dispersed sparsely throughout the section. The overall mineralogical and textural features indicate that the rock has undergone medium- to high-grade metamorphism, classifying it as garnetiferous quartzite.

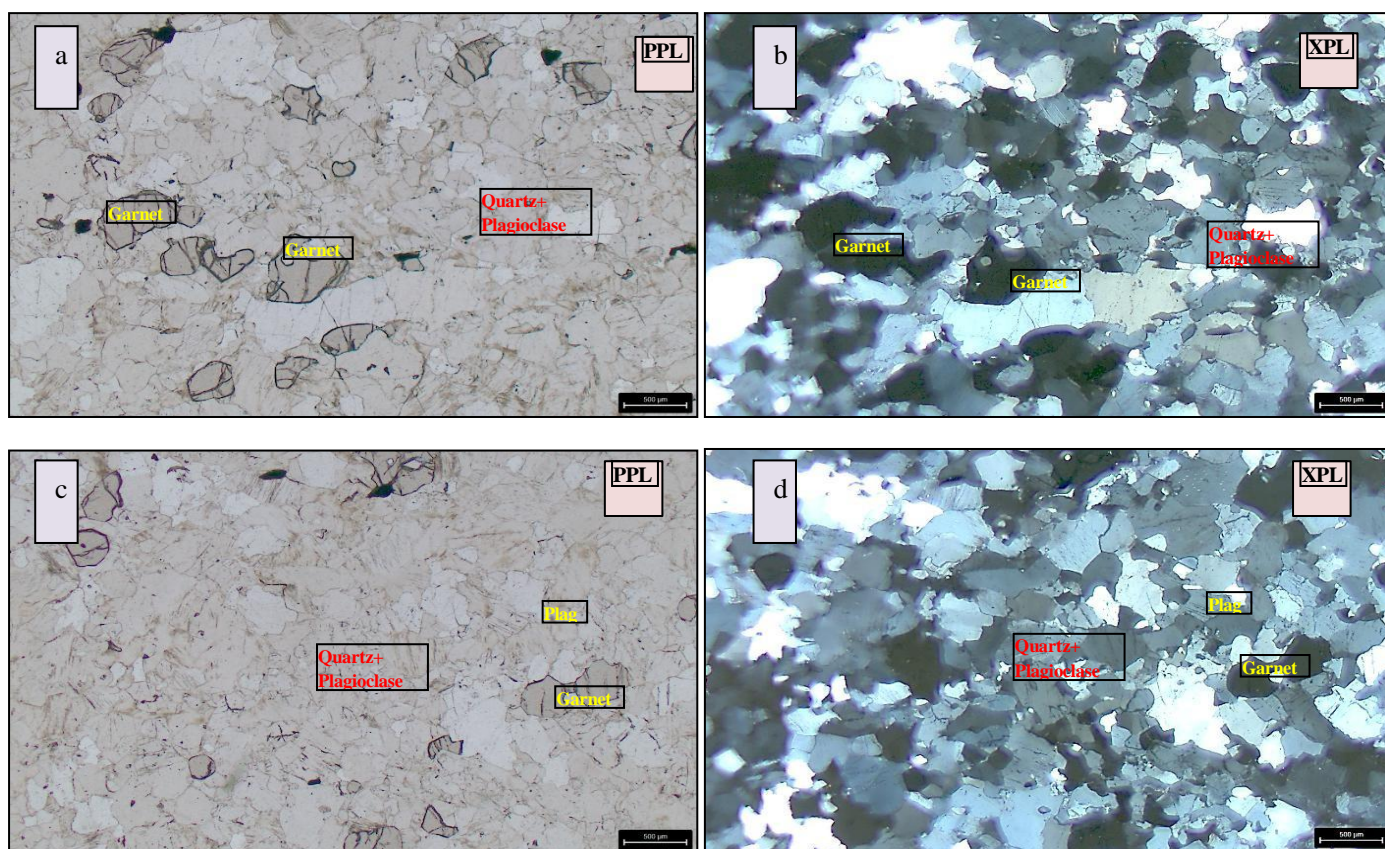


Figure 6.11: Photomicrograph of a, c – Garnetiferous quartzite under plane polarized light, b,d – Garnetiferous quartzite under crossed polarized light

Sample: KABH-1/M-4

Rock Type: Garnetiferous quartzite

The thin section analysis reveals a predominant mineral assemblage of quartz and garnet, with only a minor presence of feldspar and opaque minerals. Quartz grains display a granoblastic texture with sutured boundaries, indicative of dynamic recrystallization and post-metamorphic strain. Garnet occurs as subhedral to euhedral porphyroblasts, medium to coarser in grain size, and remains isotropic under crossed polars.

Plagioclase is present in a very limited proportion, appearing as small, irregular grains interspersed within the quartz matrix. Due to low feldspar content, the rock is best classified as garnetiferous quartzite, reflecting its dominant quartz-garnet composition and the metamorphic conditions it has undergone.

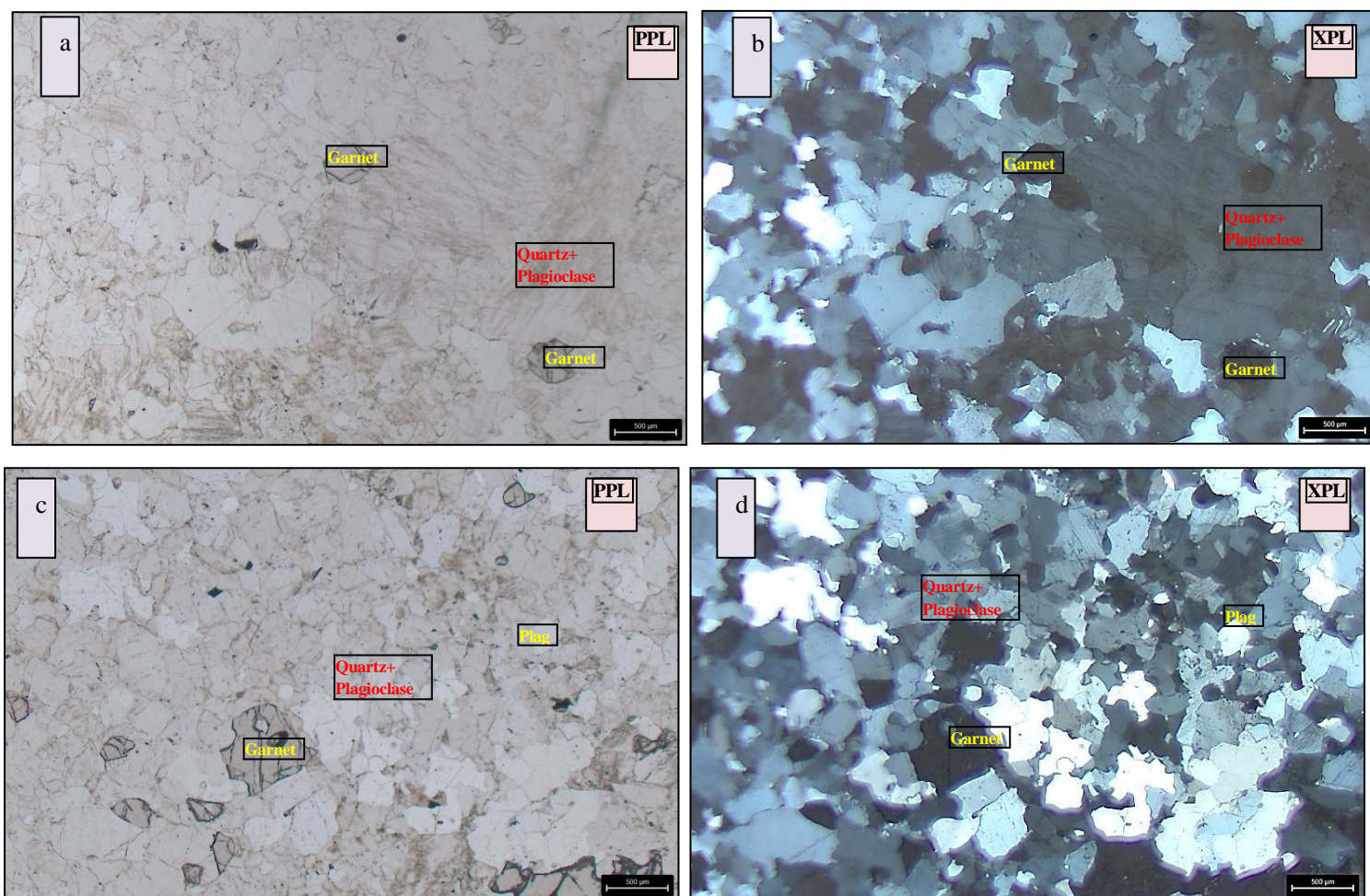


Figure 6.12: Photomicrograph of a, c – Garnetiferous quartzite under plane polarized light, b, d – Garnetiferous quartzite under crossed polarized light

Sample: KABH-1/M-5

Rock Type: Charnockite

In thin section (Fig.6.13) the rock exhibits a medium- to coarse-grained granoblastic texture, composed predominantly of quartz, plagioclase, microcline, orthopyroxene, biotite, and opaque magnetite. A crude gneissic foliation is discernible, developed through the preferred alignment of minerals. Myrmekitic intergrowths between quartz and plagioclase are evident along grain boundaries, indicating late-stage magmatic or metamorphic processes.

Microcline, identifiable by its characteristic cross-hatched twinning under crossed polars, is the dominant feldspar phase, exceeding the proportion of plagioclase. Plagioclase grains exhibit deformation twinning and minor sericitization along cleavage planes. Quartz appears subhedral and shows undulose extinction, suggesting strain-induced recrystallization. Biotite occurs as subhedral lath-like grains, often associated with orthopyroxene-rich patches, which are aligned along a very weak gneissic foliation. Magnetite is sparsely distributed as fine-grained opaque inclusions.

Given the mineralogical composition, the dominance of microcline over plagioclase, and the presence of orthopyroxene, the rock is identified as charnockite.

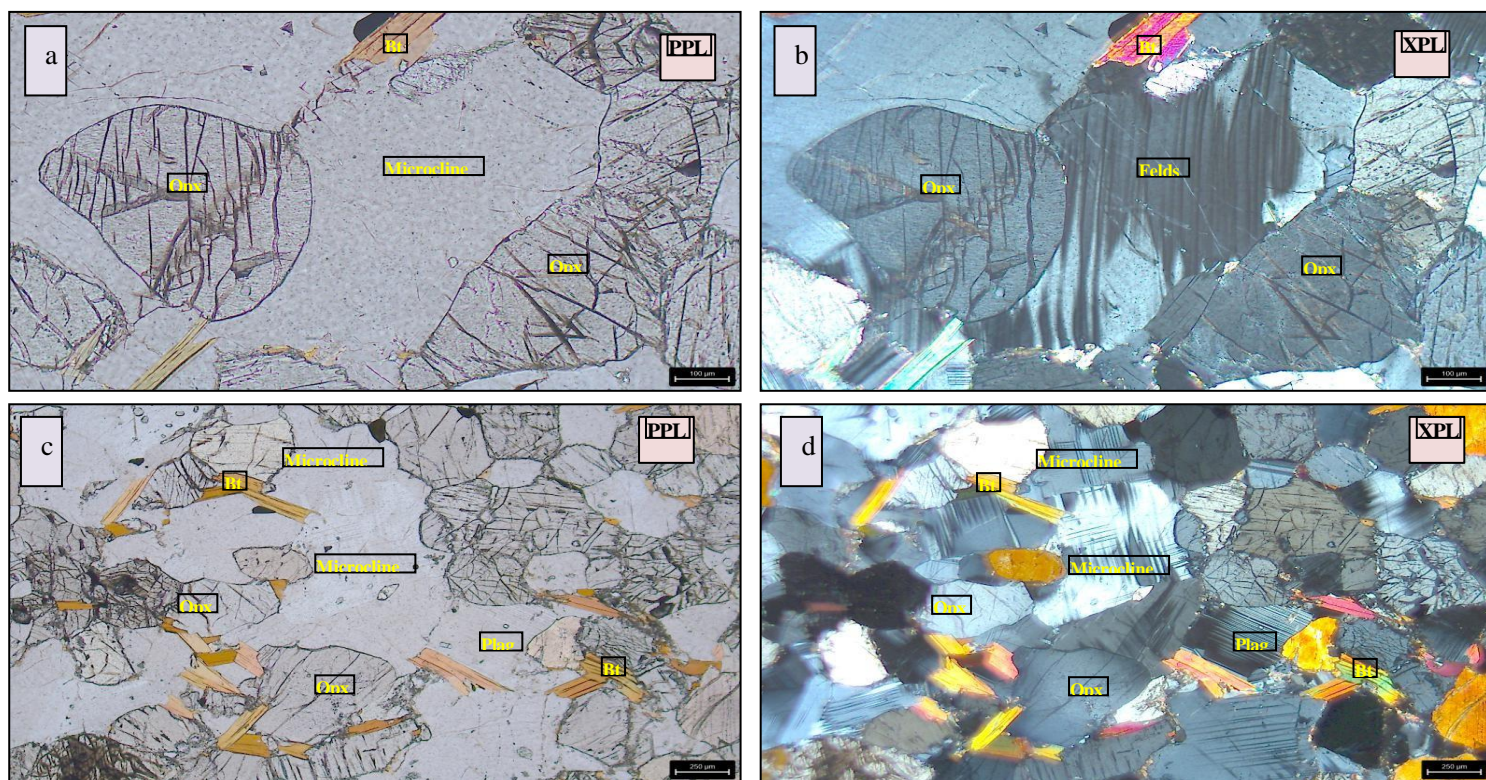


Figure 6.13: Photomicrograph of a, c – Charnockite under plane polarized light, b,d – Charnockite under crossed polarized light

Sample: KABH-2/M-6

Rock Type: Garnetiferous Quartzite

The thin section (Fig.6.14) analysis reveals a predominant mineral assemblage of quartz and garnet, with only a minor presence of feldspar and opaque minerals. Quartz grains display a granoblastic texture with sutured boundaries, indicative of dynamic recrystallization and post-metamorphic strain. Garnet occurs as subhedral to euhedral porphyroblasts, medium to coarser in grain size, and remains isotropic under crossed polars.

Plagioclase is present in a very limited proportion, appearing as small, irregular grains interspersed within the quartz matrix. Due to the low feldspar content, the rock is best classified as garnetiferous quartzite, reflecting its dominant quartz-garnet composition and the metamorphic conditions it has undergone.

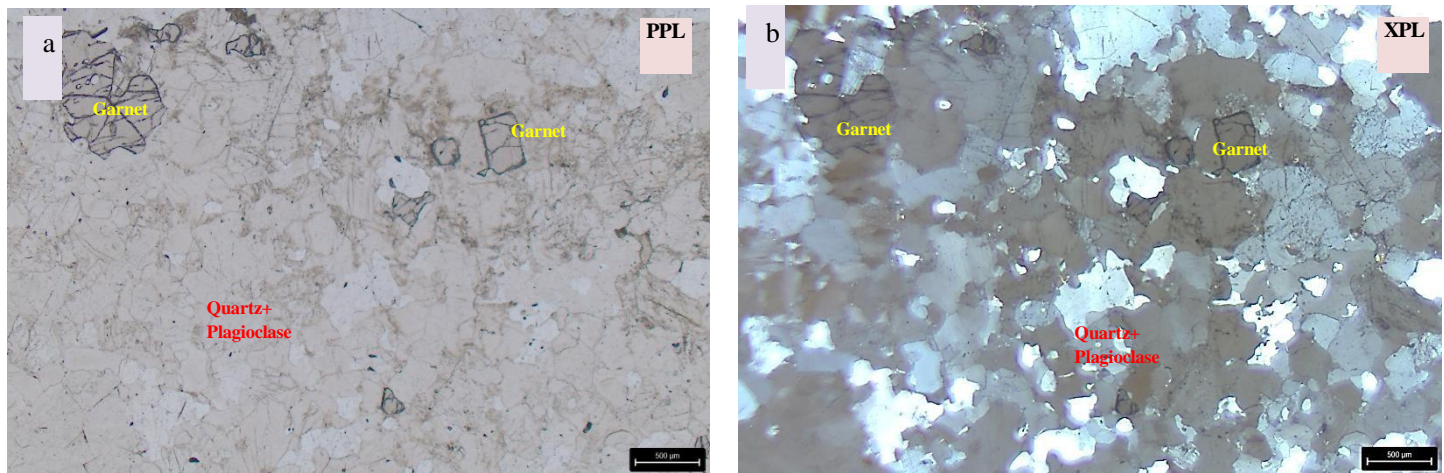


Figure 6.14: Photomicrograph of a – Garnetiferous quartzite under plane polarized light, b– Garnetiferous quartzite under crossed polarized light

Rock Type: Khondalite

The thin section (Fig.6.15) reveals a quartzo-feldspathic metamorphic rock with a well-developed foliation, primarily defined by aligned garnet and sillimanite grains. The mineral assemblage consists of quartz, feldspar, garnet, and sillimanite.

Garnet occurs as subhedral to anhedral grains and is distinctly oriented along the dominant foliation direction, reinforcing the rock's metamorphic fabric. Sillimanite, present as prismatic grains, is similarly aligned along the foliation, further accentuating the deformation structure. Under plane-polarized light (PPL), sillimanite appears colourless to pale yellow, while under crossed polars (XPL), it exhibits high birefringence with characteristic higher-order pink and yellow interference colors and straight extinction.

The remaining matrix is composed of a quartzo-feldspathic groundmass, contrasting with the garnet- and sillimanite-rich domains. The high degree of mineral alignment and the

textural attributes confirm that this rock is khondalite.

Sample: KKBH-3/M-8

Rock Type: Khondalite

The rock (Fig.6.16) is a medium-grained quartzo-feldspathic metamorphic rock characterized by a distinct foliation, primarily defined by the preferred alignment of garnet and sillimanite. Garnet occurs as subhedral to anhedral grains, consistently oriented along the dominant foliation direction, while sillimanite appears as elongated prismatic grains, reinforcing the metamorphic fabric.

Quartz and feldspar form the remaining matrix, providing a contrasting backdrop to the aligned garnet and sillimanite. The mineral alignment, particularly the foliation-defining garnet and sillimanite, is indicative of intense deformation and metamorphism. Under plane-polarized light, sillimanite is nearly colourless to pale yellow, while in crossed polars, it exhibits high birefringence with characteristic pink and yellow interference colors and straight extinction.

This combination of mineralogy, grain orientation, and structural fabric distinctly classifies the rock as khondalite.

Sample: KKBH-3/S-4/M-9

Rock Type: Quartzo-feldspathic graphite gneiss

The Megascopic feature (Fig.6.17) exhibits a lepidoblastic texture with alternate quartzofeldspathic and graphite-rich layers. Under microscopic study, the thin section predominantly shows the quartzofeldspathic portion of the rock with coarse quartz grains display mild undulose extinction and irregular grain boundaries. Feldspar, very minimal in number but mainly plagioclase, exhibits very weak sericitization. There are some occurrences of brown patches within the thin section indicating development of hydrous secondary phases. Graphite is present as fine-grained disseminations and as flakes along foliation planes, forming streaky layers. Biotite is present as small laths. The mineralogical composition and textural features indicate high-grade metamorphism, with graphite enrichment along foliations. Therefore, the thin section was identified as quartzo-feldspathic graphite gneiss taking into consideration both microscopic and megascopic properties.

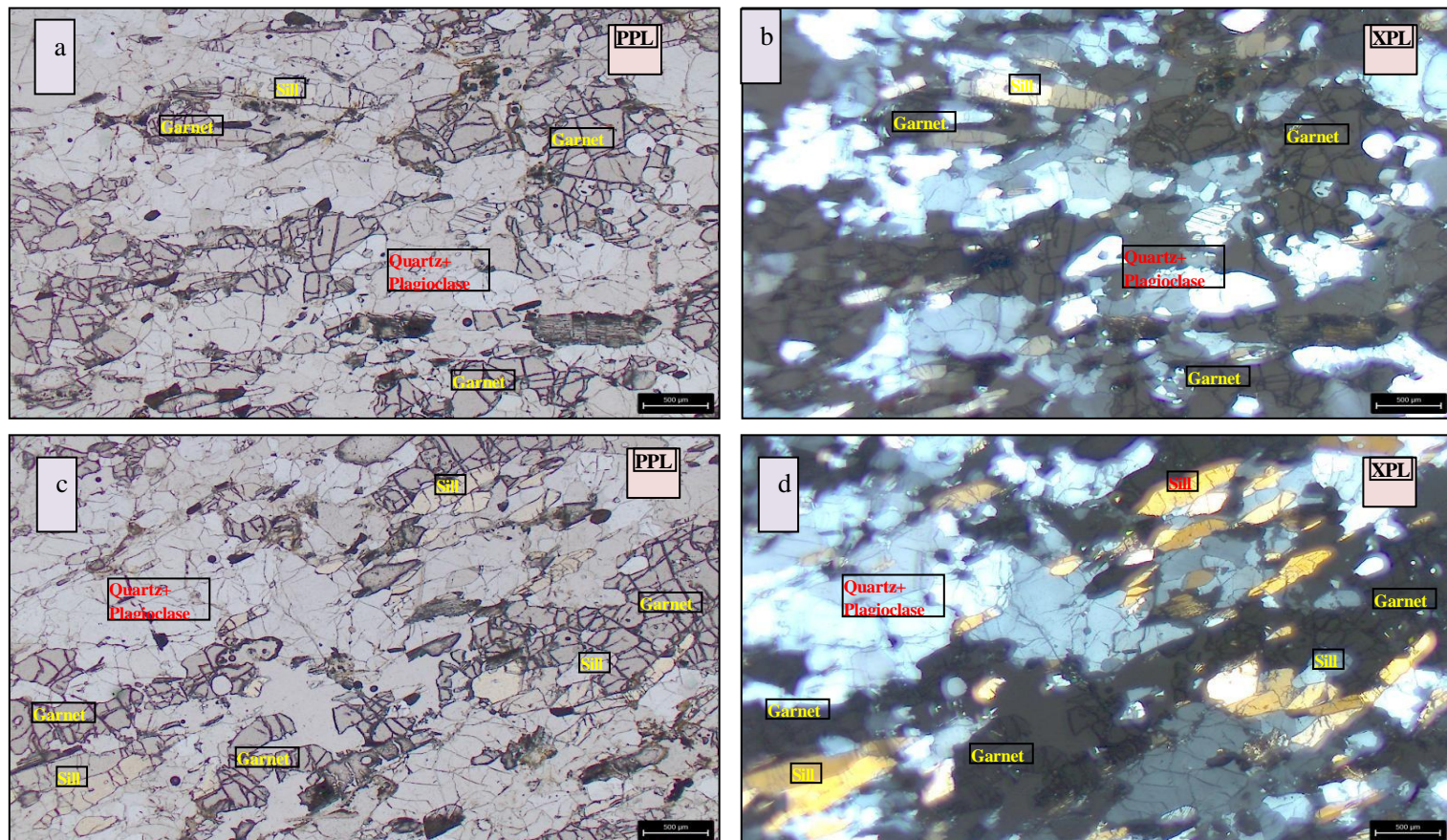


Figure 6.16: Photomicrograph of a, c – Khondalite under plane polarized light, b,d – Khondalite under crossed polarized light

Sample: KABH-3/S-12/M-10

Rock Type: Quartzo-feldspathic graphite gneiss

The thin section (Fig.6.18) reveals a well-developed gneissic fabric, primarily defined by alternate quartz-rich and feldspar-rich layers and patches, all aligned along the dominant foliation plane. There is almost very minor presence of mafic minerals. The segregation of quartz and plagioclase suggests partial melting, and likely represents the leucosomal portion of the rock.

Quartz grains are coarse, exhibiting undulose extinction and irregular grain boundaries, while plagioclase shows lamellar twinning with slight retrograde alteration. Graphite occurs as fine disseminations and elongated flakes concentrated along the foliation planes, forming streaky bands. Biotite is present as small laths but is relatively sparse, further emphasizing the felsic nature of the rock. Given its mineralogical composition, structural attributes, and the clear foliation defined by quartz and feldspar layering, the rock is identified as quartzo-

feldspathic graphite gneiss, and likely representing a leucosome-rich domain within a migmatitic system.

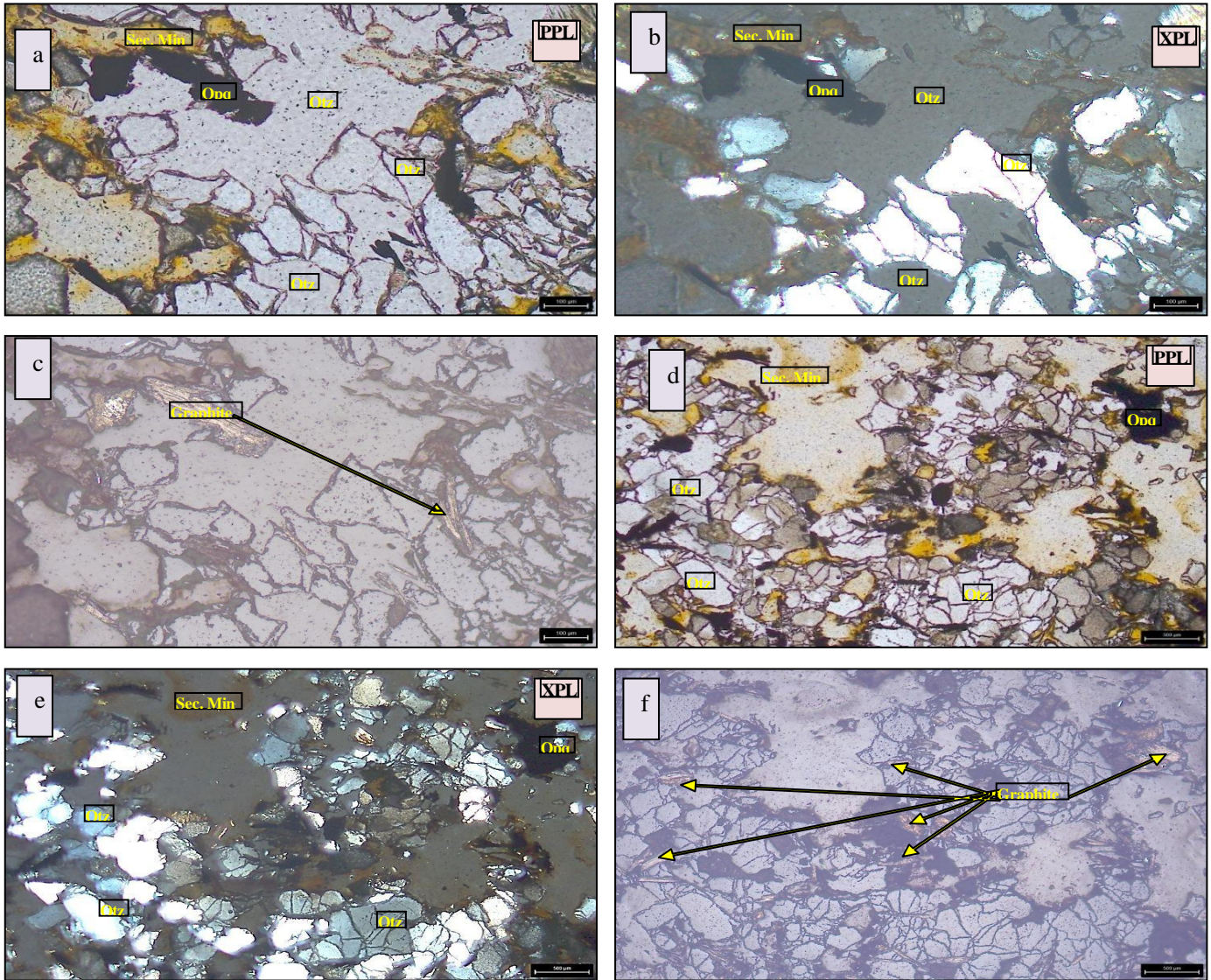


Figure 6.17: Photomicrograph of a, c, d, – Quartzo-feldspathic graphite gneiss under plane polarized light, b, e, f – Quartzo-feldspathic graphite gneiss under crossed polarized light

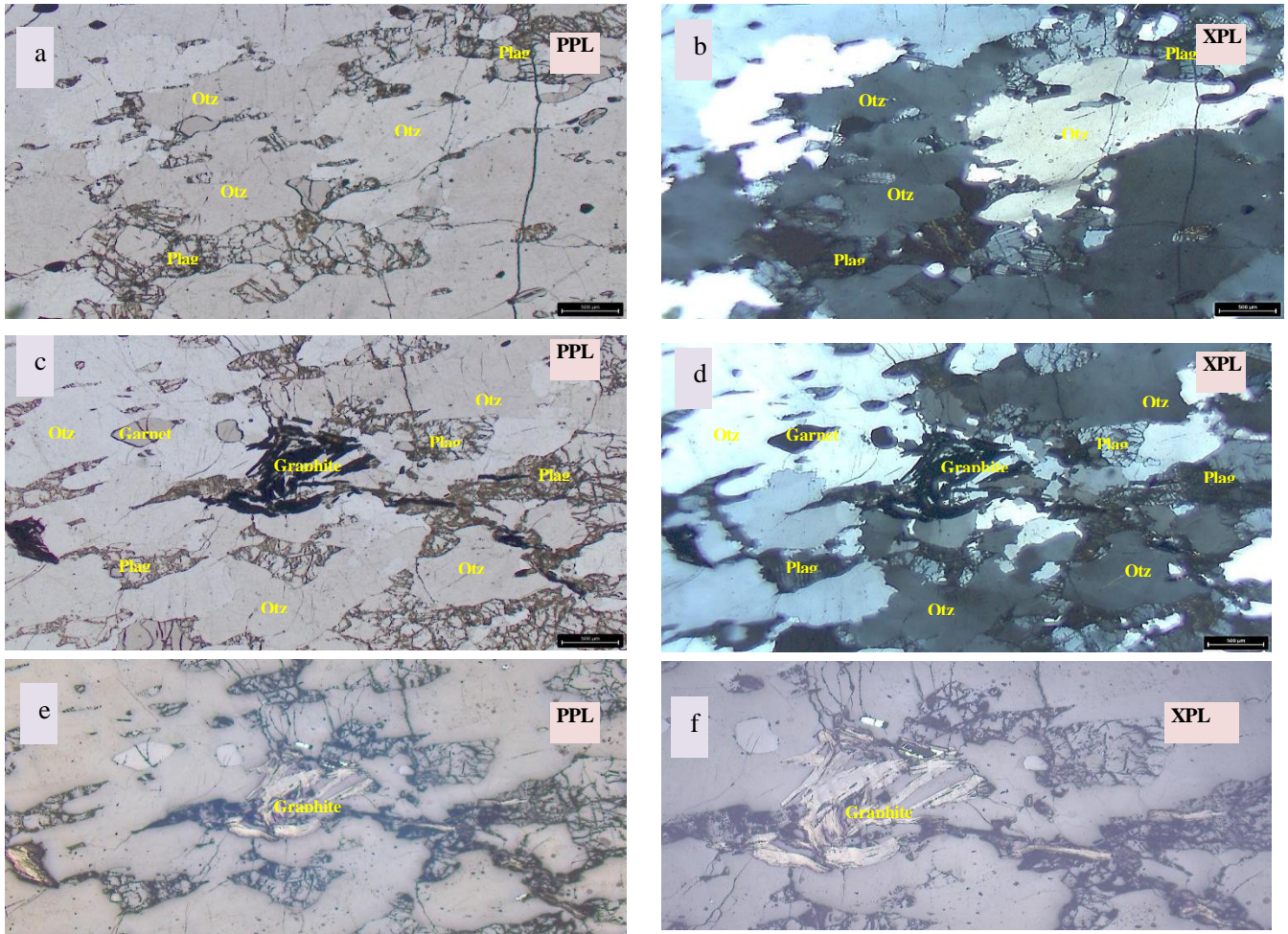


Figure 6.18: Photomicrograph of a, c, e – Quartzo-feldspathic graphite gneiss under plane polarized light, b, d, f – Quartzo- -feldspathic graphite gneiss under crossed polarized light

6.1.1.5 Petrochemical studies

The detailed description of the petrochemical composition of the samples are given in the following table

| Table 6.A Analysis report for petrochemical studies | | | | | | | | | | | | | | | | | | | |
|---|------------------|---------|------------------------------------|---------|---------|------------------------------------|------------|------------------------------------|----------------------|---------|---------|-----------------------|-----------------------------------|---------------------|----------------------|----------------------|---------|-----------------------------------|---------|
| Sl. No | Sample number | Lab ID | Al ₂ O ₃ (%) | BaO (%) | CaO (%) | Cr ₂ O ₃ (%) | Fe (T) (%) | Fe ₂ O ₃ (%) | K ₂ O (%) | MgO (%) | MnO (%) | Na ₂ O (%) | P ₂ O ₅ (%) | SO ₃ (%) | TiO ₂ (%) | SiO ₂ (%) | SrO (%) | V ₂ O ₅ (%) | LOI (%) |
| 1 | KTBH-3/M-1 | G727-10 | 16.89 | 0.08 | 0.98 | <0.05 | 4.51 | 6.45 | 3.96 | 1.36 | 0.14 | 1.28 | 0.05 | 0.31 | 0.69 | 67.34 | <0.05 | <0.05 | 0.37 |
| 2 | KABH-2/M-2 | G727-11 | 17.29 | 0.07 | 0.83 | <0.05 | 5.54 | 7.91 | 4.27 | 1.57 | 0.33 | 1.66 | <0.05 | 0.19 | 0.81 | 64.94 | <0.05 | <0.05 | <0.05 |
| 3 | KABH-1/M-3 | G727-12 | 13.76 | 0.09 | 1.65 | <0.05 | 1.76 | 2.52 | 4.37 | 0.36 | <0.05 | 2.88 | <0.05 | <0.05 | 0.23 | 74 | <0.05 | <0.05 | <0.05 |
| 4 | KABH-1/M-4 | G727-13 | 13.42 | 0.07 | 1.43 | <0.05 | 1.66 | 2.38 | 4.46 | 0.38 | <0.05 | 2.97 | <0.05 | <0.05 | 0.19 | 74.46 | <0.05 | <0.05 | 0.1 |
| 5 | KABH-1/M-5 | G727-14 | 13.61 | <0.05 | 9.01 | 0.12 | 7.95 | 11.37 | 0.52 | 12.49 | 0.16 | 1.03 | 0.12 | 0.22 | 0.99 | 49.89 | <0.05 | <0.05 | 0.34 |
| 6 | KABH-2/M-6 | G727-15 | 14.25 | 0.07 | 2.9 | <0.05 | 2.68 | 3.83 | 3.82 | 1.21 | 0.08 | 2.28 | <0.05 | <0.05 | 0.29 | 70.88 | <0.05 | <0.05 | 0.25 |
| 7 | KKBH-3/M-7 | G727-16 | 18.14 | <0.05 | 0.65 | <0.05 | 7.9 | 11.29 | 3.12 | 2.66 | 1.03 | 0.22 | 0.08 | 0.08 | 0.84 | 61.18 | <0.05 | <0.05 | 0.53 |
| 8 | KKBH-3/M-8 | G727-17 | 18.16 | 0.07 | 0.41 | <0.05 | 5.67 | 8.1 | 3.7 | 1.78 | 0.77 | 0.26 | 0.08 | 0.11 | 0.72 | 65.43 | <0.05 | <0.05 | 0.32 |
| 9 | KKBH-3/S-4/M-9 | G727-18 | 7.46 | <0.05 | 0.08 | <0.05 | 3.31 | 4.73 | 1.98 | 0.72 | 0.11 | 0.08 | 0.25 | 3.31 | 0.3 | 74.81 | <0.05 | <0.05 | 6 |
| 10 | KABH-2/S-12/M-10 | G727-19 | 15.52 | 0.07 | 0.56 | <0.05 | 4.54 | 6.49 | 3.9 | 1.55 | 0.14 | 0.78 | <0.05 | 3.04 | 0.72 | 65.28 | <0.05 | <0.05 | 1.81 |

6.1.2 Structure

The area lacks primary structures due to intense migmatization of the country rock. However, several secondary structures were observed during fieldwork as follow:

Foliation: The majority of the rocks in the area exhibit gneissosity foliation, with the general trend varying between N60°W and N20°W. The dip of the foliation ranges from 45° to 60° towards southwest. (Fig.6.19)

Gneissosity: Gneissosity is well-developed in both granite gneiss and khondalite. In granite gneiss gneissosity is characterized by alternate light-colored bands rich in quartz and feldspar and darker layers dominated by biotite. In khondalite gneissosity is defined by alternate light-colored bands rich in quartz and feldspar with darker layers dominated by garnet and sillimanite.(Fig.6.19)

Joints: The following joint sets were observed:

Granite gneiss: 245°/68° towards Southeast and 320°/45° towards Northeast.

Charnockite: 55°/70° towards Southeast and 300°/80° towards Southwest.

Isoclinal fold: A fold with inter-limb angle ($<10^\circ$) observed within the granite gneiss near Indira Nivas Colony. (Fig.6.19)

Flow Banding: Found in migmatized charnockite and migmatized khondalite litho-units due to the flow of magma generated from partial melting at extreme high temperature in granulite facies metamorphism. (Fig.6.19)

Flow Folding: This type of folds found in migmatized charnockite formed due to the simple shear caused within the viscous layers. (Fig.6.19)

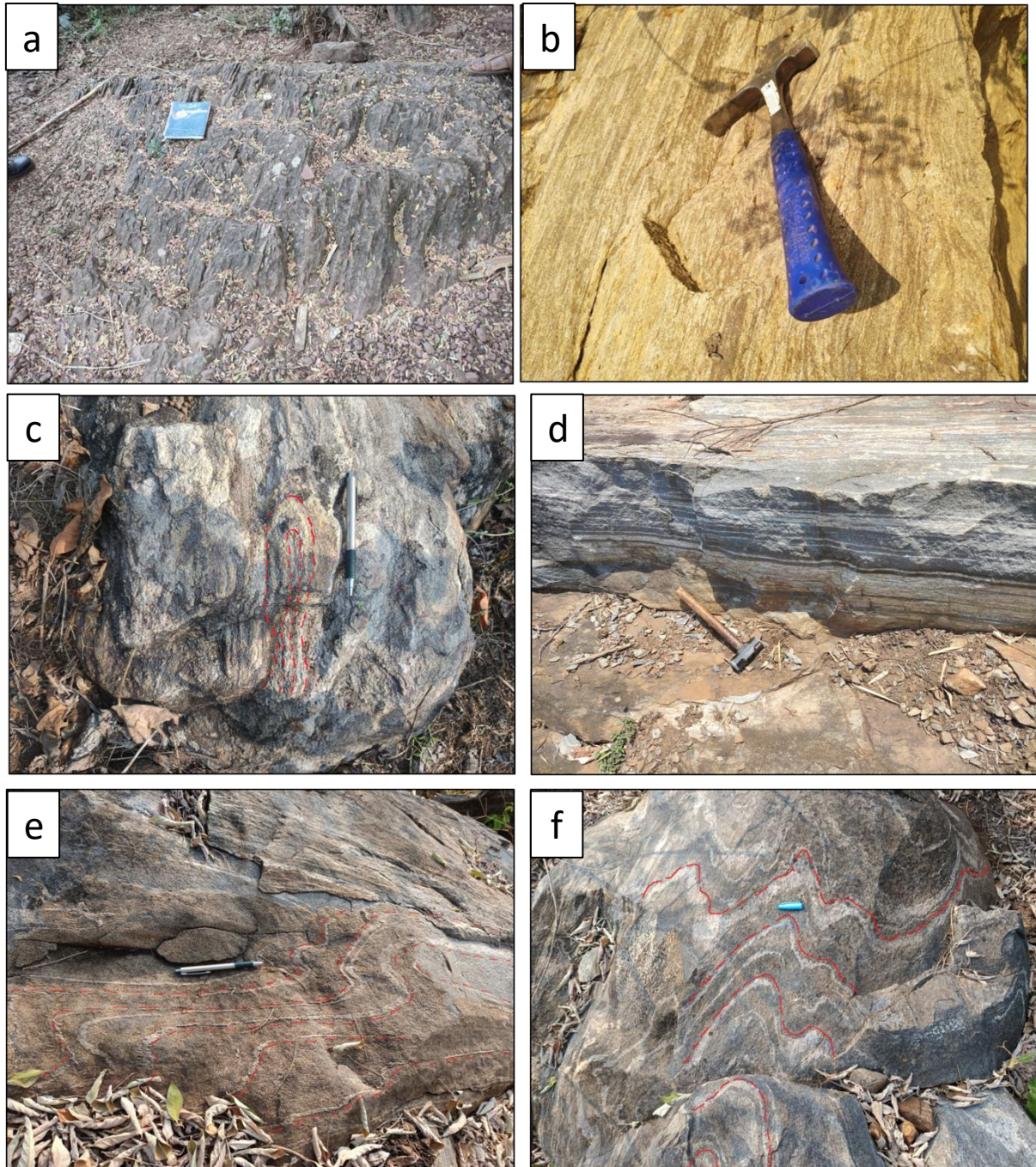


Fig.6.19: Field photographs of (a) Khondalite showing well developed foliation, (b) Gneissosity in granite gneiss; (c) Isoclinal fold in granite gneiss; (d) Migmatised khondalite contains flow banding; (e & f) Flow folding in migmatised charnockite

6.1.3 Metamorphism

The characteristic mineral assemblages of the lithological units in this area are as follows:

- *Quartz + K-feldspar + Sillimanite + Garnet + Plagioclase* (Khondalite)
- *Quartz + K-feldspar ± Garnet + Plagioclase ± Biotite* (Granite gneiss)
- *Quartz + Plagioclase + Orthopyroxene ± Biotite* (Charnockite)
- *Quartz + Plagioclase + Garnet* (Leptynite)
- *Wollastonite + Diopside + Plagioclase + Quartz* (Calc silicate)

These mineral assemblages suggest that the rocks have undergone metamorphism under granulite facies conditions. The presence of biotite inclusions in thin section analysis indicates that local retrogression occurred resulting in the breakdown of pyroxenes to form biotite.

6.1.4 Mineralogy of ore zones and ore texture

In the area of investigation fine disseminated graphite flakes are seen mostly in khondalite and also found on the plane of gneissosity in granite gneiss, but charnockite is devoid of it. The primary economic concentration of graphite is found in quartzo-feldspathic graphite gneiss where the graphite mineralization is most prominent. Graphite flakes are typically aligned parallel to the foliation planes creating a gneissose texture. Additionally flakes of graphite is also observed along the grain boundaries of various gangue minerals, such as quartz, feldspar, sillimanite and biotite. Coarser graphite flakes forming vein-type mineralization on a centimeter scale are particularly found in association with calc-granulite formations.

6.1.5 Trenching

In the mapped area, trenching (Fig.6.20) is commonly done to expose bedrock for the purpose of identifying and investigating graphite mineralization. All trenches are excavated perpendicular to the strike of the graphite-bearing lithological units.

Methodology

1. Site selection: The locations of the trenches are chosen based on the groove line and the SP data value to check the existence of graphite band concealed under thick soil cover. Trenches are typically placed approximately 100 meters away from groove line perpendicular to strike.
2. Marking the trench location: Once the trench location is determined, the trench line is clearly marked on the ground using lime.
3. Excavation: The excavation process is carried out with the help of JCB or manually in inaccessible zones using basic tools such as pickaxes and shovels. And the trench is excavated across the strike of the ore body to find out its continuity and width of mineralised zone.

4. Sample collection: After excavation, the trenches are cleaned, and continuous chip samples are collected along the trench. Each sample represents a 1-meter length in uniform lithology to ensure uniform and representative material for analysis.

5. Backfilling: Following the collection of samples, the trenches are backfilled to restore the site to its original condition.

Analytical results:-

A total of six trenches were excavated across graphite-bearing zones at Durgi, Talabarangapadar, and Alubarhi, with a cumulative volume of 100 cubic meters. However, due to the presence of a very thick soil cover, no samples were available for chemical analysis.

6.1.6 Ore zones

The ore zones were categorized into two groups:

- a) Major Zones (PLATE-II):- Characterized by F.C content greater than 2%.
- b) Minor Zones (PLATE-II):- Characterized by F.C content less than 2%.



Fig.6.20 Different Stages of trench development

Majority of the graphite zones are hosted by khondalite and granite gneiss in this region.

Preliminary investigations, incorporating traverse mapping and surface exposure analytical results; have led to the identification of three major graphite zones. The locations of these zones are as follows:-

- i) **Zone-A** ($19^{\circ}20'52.3''$ N, $83^{\circ}36'18.3''$ E)

The graphite zone (Plate-II) is located to the northern part of Kodabata village. Graphite mineralization occurs at the contact zone between granite gneiss and

khondalite, with prominent outcrops of quartzo-feldspathic graphite gneiss along the nala section. Based on integrated geological and geophysical data, the interpreted strike length of this zone is 339 meters, with a surface thickness of 52 meters. Attitude of the zone is $310^{\circ}/60^{\circ}$, dipping southwesterly. Chemical analyses of bed rock samples (BRS) present fixed carbon percentages ranging from 4.162% to 10.21% (Annexure I).

ii) Zone-B ($19^{\circ}20'52.00''$ N, $83^{\circ}36'46.8''$ E)

The graphite zone (Plate-II) is located within a hillock near the southwestern part of Tala Barangapadar village, where a well-exposed cross-section is visible at the hillock's basement. The host rock is khondalite, containing graphite flakes oriented parallel to the foliation plane. Based on integrated geological and geophysical data, the interpreted strike length of this zone is 190 meters, with a surface thickness of 50 meters. The zone's attitude is $310^{\circ}/50^{\circ}$, dipping southwesterly. Chemical analysis of collected bed rock samples (BRS) shows fixed carbon value ranging from 5.912% to 9.935% (Annexure I).

iii) Zone-C ($19^{\circ}19'54.8''$ N, $83^{\circ}37'40.4''$ E)

Rock exposures were found in a section along a paddy field. This zone is situated to the north-western part of Alubarhi village (PLATE-II). The host rock is granite gneiss within which flakes of graphite is parallel to the gneissosity plane. As per the chemical analyses (Annexure I) of recorded BRS the fixed carbon value for this zone varies from 5.912 % to 9.935 %.

Based on the geological and geophysical data the interpreted strike length of this zone is 160m and the surface thickness is 44 m. The attitude of the zone is $330^{\circ}/55^{\circ}$ southwesterly.

Out of 7 graphite bearing zones 4 zones show FC values below cutoff grade i.e. less than 2 % after analysis. So the following zones are considered as minor graphite zones wise:-

i) Zone-D(m) ($19^{\circ}20'36.5''$ N, $83^{\circ}37'17.4''$ E)

This zone (PLATE-II) is situated to the north-western side of Upara Barangapadar village. Exposures are seen in a small hillock where flakes of graphite were encountered within khondalites.

ii) Zone-E(m) ($19^{\circ}19'16.4''$ N, $83^{\circ}36'51.3''$ E)

This zone (PLATE-II) is located to the northeastern side of Chakrigurha village. A small hillock containing well exposed granite gneiss as host rock. Small flakes of graphite were found in disseminated form with alternate bands of quartz and feldspar. Average (F.C) of this zone is less than 2%.

iii) Zone-F(m) (19°21'02.0'' N, 83°35'50.2'' E)

To the northern part of Durgi town (PLATE-II) well exposed khondalites as host rock containing flakes of graphite.

iv) Zone-G(m) (19°18'48.1'' N, 83°37'42.4'' E)

Within a revenue forest near Barhapulisi village (PLATE-II) well exposed khondalites containing disseminated flakes of graphite with alternate garnet, quartz and feldspar rich layers. Average (F.C) is less than 2%.

6.2 Geophysical exploration:-

Objective of the study

The main objectives of the study are as follows.

1. To confirm the consistency of surface graphite exposure identified through geological mapping in the underlying subsurface layers.
2. To delineate concealed graphite mineralizations within geologically defined regions known for graphite occurrences.
3. To delineate successful drilling points to trace graphite mineralizations.

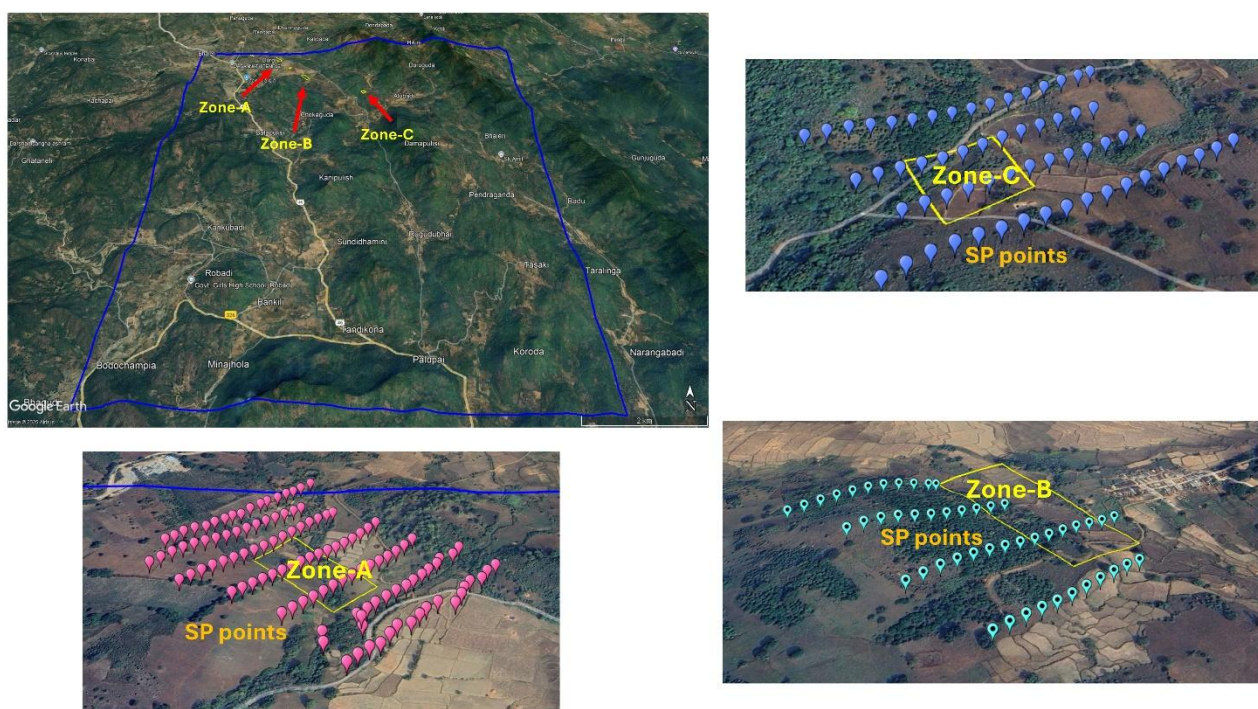


Fig.6.2.1- Location of the Kanapulisi block and the three zones Zones -A, B, C where SP and magnetic surveys were carried out. The SP survey points distributions are shown in the zoomed part of Zone-A, B, C.

General description of the area

The Kanapulisi Block is located in southern Odisha, in Rayagada District, approximately 50 km northeast of the district headquarters, Rayagada. Self-potential (SP) and magnetic surveys were conducted across three identified graphite potential zones—Zone A near Kodabata ($19^{\circ}20'39.0''\text{N}$, $83^{\circ}36'14.0''\text{E}$), Zone B near Tala Barangapadar ($19^{\circ}20'27.0''\text{N}$, $83^{\circ}36'51.0''\text{E}$), and Zone C near Alubarhi village ($19^{\circ}19'53.30''\text{N}$, $83^{\circ}37'38.07''\text{E}$). These zones were delineated based on detailed geological mapping on 1:12,500 scale (Fig.1).

The Kanapulisi graphite block is geologically influenced by four major litho units viz granite gneiss, leptynite, mafic granulite, calc granulite, khondalite, and charnockite. Graphite occurrences are mainly confined to quartzo-feldspathic graphite gneiss associated with two types of host rock: granitic gneiss and khondalite. Both rock types generally exhibit moderate to low magnetic susceptibility in the range of 10^{-3} - 10^{-5} SI units. The geological map of the area is shown in Fig.6.2.2.

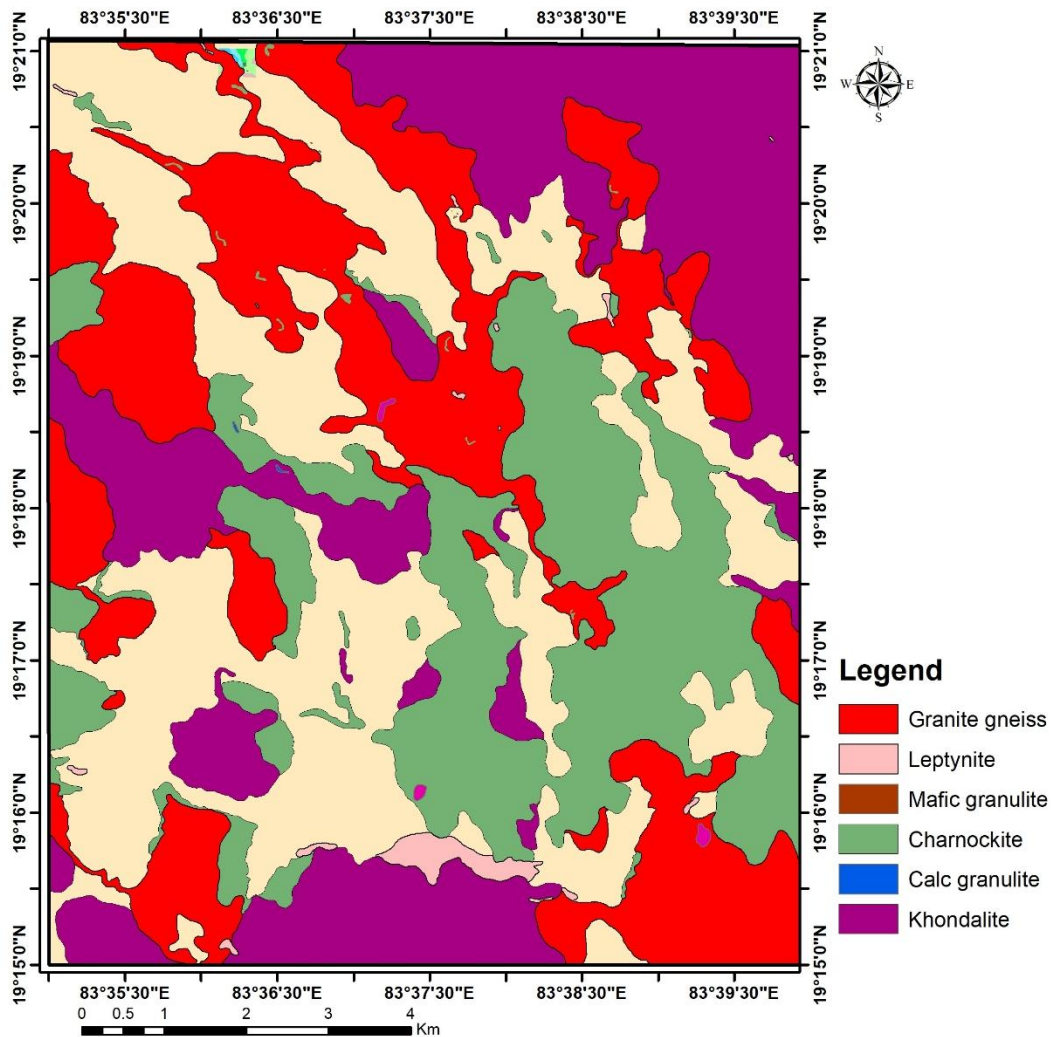


Fig.6.2.2 Geology map of Kanapulisi block on 1:12500 scale.

Charnockite is the dominant lithology, occupying approximately 50% of the area. It forms large domal exposures in the central, eastern, and southwestern regions and is recognized by its greasy appearance, coarse grain size, and presence of pyroxene and garnet. Granite gneiss covers about 30% of the area and is widely exposed in the northwestern, western, and southeastern parts. It is marked by its pinkish-white color, well-developed foliation, and alternate bands of light and dark minerals. Khondalite accounts for roughly 15% of the

region, found mainly in high-elevation areas in the northeastern, southern, and western zones. It is highly weathered, foliated, and migmatized with abundant garnet and sillimanite.

Leptynite occupies about 3% of the area and appears as small bodies within khondalite, particularly near Palupai, Barhisola, Dhepagurha, and Kalingaguda. These units are light-colored with well-developed quartz blades. Quartzite is limited to about 1% of the area, occurring as a narrow band near Palupai village. It is hard, compact, and composed mainly of quartz with some garnet. Basic granulite covers around 2% of the area and is found as narrow bands and patches within granite gneiss and leptynite, especially near Bankili and Chakrigurha. Calc-silicate granulite is the least extensive, occupying just 1% of the area. It is localized in Tenupulisi and Rangamati area and characterized by greenish-white color and compositional banding due to differential weathering

SP and Magnetic data acquisition

The fixed base approach was employed in this project to acquire Self-Potential (SP) data. A total of 4.5 line km with 20m profile spacing were surveyed, each spanning a length that varies between 240m and 340m depending on the accessibility and feasibility of the area. A total of three small zones i.e. Zone-A, B, C were selected for both SP and magnetic studies (Fig.1). The details of the zones are given in the table-1. Both SP and magnetic surveys were carried out during July-August, 2024. The spacing between profiles was irregular depending on the spatial dimension of the areas, tailored to meet the study's specific objectives while adhering to a predetermined total profile length constraint of 4.5 kilometers. Data points were recorded at regular intervals of 20 meters. Geological insights into graphite occurrences informed the selection of field parameters for SP data acquisition. Profile orientation was standardized along perpendicular to the strike of the geological formations under investigation. Some profiles were taken across the known graphite areas, whereas some were on the soil cover. In some places one profile along the strike line also was taken for comprehensive study. Details of the SP data acquisition are shown in Table 6.2.1. To carry out SP we have used IGIS DC resistivity meter model DDR-3 utilizing two copper sulphate porous pots as electrodes to record the SP voltage of the earth. One handheld GPS (Garmin) was used to note down latitude, longitude, and elevation information. One universal base station and different local base stations were established regarding each profile. Repeat readings were taken for good-quality data, enhancing reliability and confidence. Magnetic surveys were also carried out in the same areas using two proton precession magnetometers, GEM GSM19TW, where one was used as a base magnetometer, taking continuous data in

minute intervals in a local cultural noise-free area. The rover magnetometer was utilized in mobile mode to collect stable, noise-free data. Repeat readings were taken for quality checks of the data. The same traverse direction was taken for the magnetic survey, too. All the

| Table 6.2.1 Showing the details of SP data acquisition at Kanapulisi | | | | | | |
|---|-----------------|---------------------------|----------------------|-----------------------------------|----------------|--------------------------|
| Zones | Location | Station spacing(m) | No of Profile | Average Profile spacing(m) | Line km | Profile direction |
| Zone_A | Kodabata | 20 | 7 | 100 | 1.15 | NE-SW |
| Zone-B | Barangapadar | 20 | 4 | 120 | 2.4 | NE-SW |
| Zone-C | Alubarhi | 20 | 4 | 70 | 0.94 | NE-SW |

precautions like avoiding any metal object, monitoring the magnetic storm and ionic activities, avoiding high voltage powerlines, etc., were taken for a standard magnetic data acquisition. A total of 300 magnetic data points were targeted for this study

| Table 6.2.2- Showing the details of magnetic data acquisition at Kanapulisi | | | | | |
|--|-----------------|-----------------------|---------------------------|------------------------------|-----------------------------------|
| Zone name | Location | No of profiles | Station spacing(m) | No of magnetic points | Average Profile spacing(m) |
| Zone-A | Kodabata | 5 | 20 | 85 | 80 |
| Zone-B | Barangapadar | 5 | 20 | 122 | 80 |
| Zone-C | Alubarhi | 5 | 20 | 93 | 80 |

SP and Magnetic data processing

The preprocessing of SP data encompassed drift correction, reference electrode calibration, and the determination of absolute SP values relative to a universal reference point at each location. The absolute SP anomaly was depicted in two formats: spatially, utilizing grid anomaly strips generated through Geosoft v.8.4 software, which presented anomalies based on their spatial locations and corresponding values; and through profile plots, illustrating the fluctuation of SP values in relation to distance. Areas characterized by negative SP values in both spatial representations and profile locations are indicative of potential promising zones for graphite occurrences.

The magnetic data processing consists of two main phases: preprocessing and advanced processing, utilizing the output data set from preprocessing. In the initial preprocessing step, each raw data file, particularly the base station file, was examined to identify any magnetic storm imprints. Subsequently, a diurnal correction was meticulously applied to each rover raw data file of the GEM system PPM using GEM Link v 5.4. For the Geomatic PPM rover magnetic data file, a specific R code was developed to apply the diurnal correction, following the algorithm employed in GEM Link. Average base value was used as a datum value in diurnal correction process. Diurnal-corrected data underwent filtering to eliminate spurious and unstable readings obtained in the proximity of cultural noise sources, such as high-tension power lines, water pumps, metallic water pipelines, etc. This process involved scrutinizing the profile plot for each specific line. Additionally, data gathered during high magnetic storm days or obtained in a non-scientific manner were systematically removed to ensure the integrity of the dataset. Some part of the preprocessing and all the advanced processing steps were carried out using Geosoft v8.4 software. Following the comprehensive preprocessing steps, the filtered magnetic data became the focus of subsequent processing. An International Geomagnetic Reference Field (IGRF) correction was initially implemented on the diurnal-corrected magnetic intensity data. The IGRF correction process was executed by subtracting the calculated IGRF value from the total magnetic field using IGRF-13 MODEL. In the processing part, regional residual separation, reduced to magnetic pole map derivation, and analytic signal map generation were attempted.

Results and Discussions

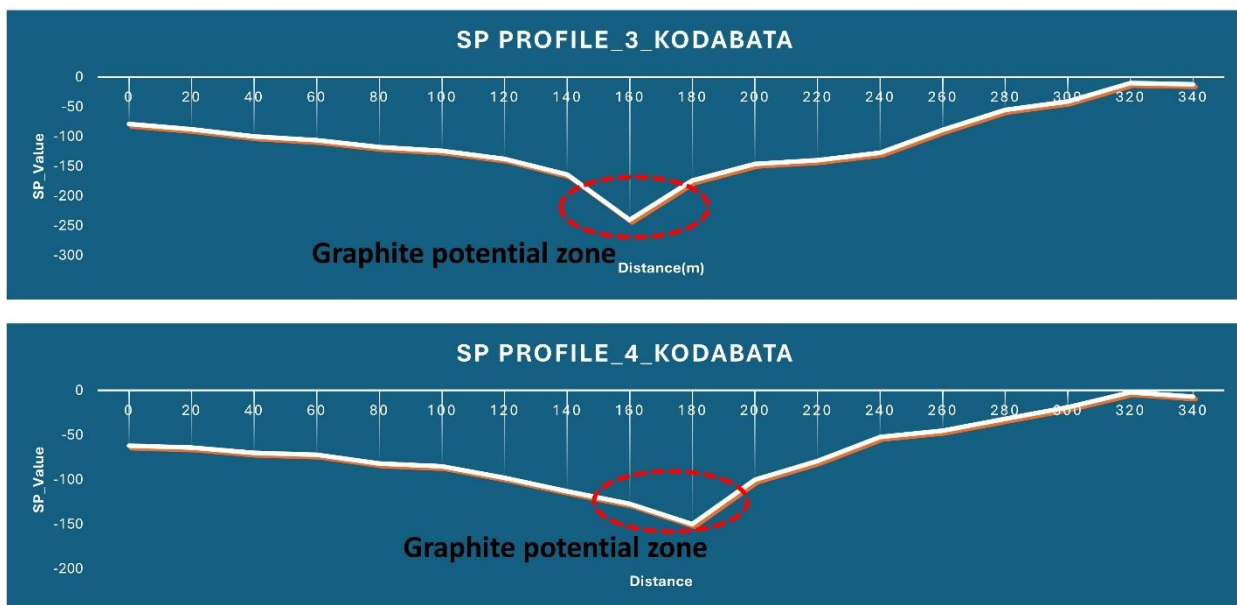
Zone-A near Kodabata

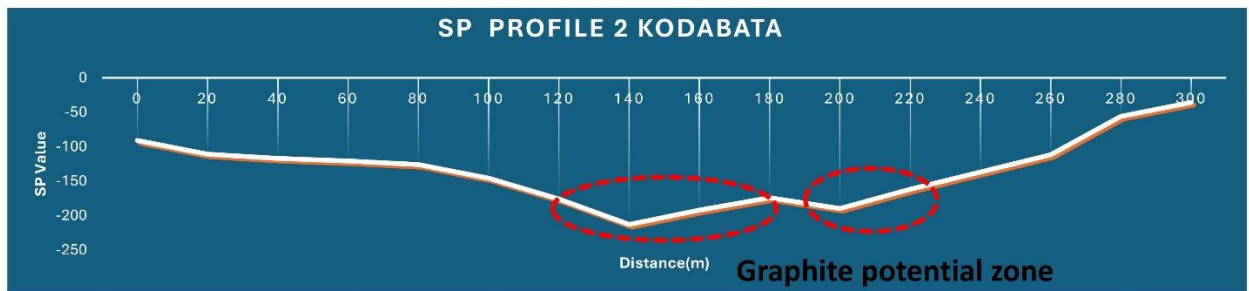
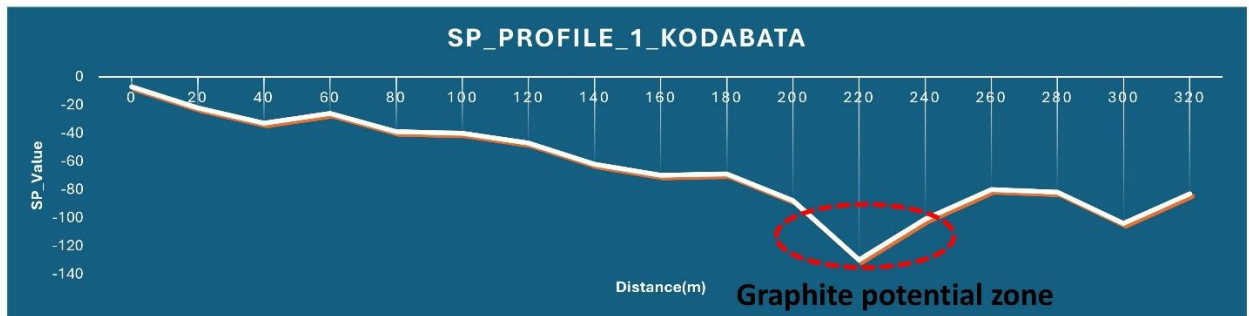
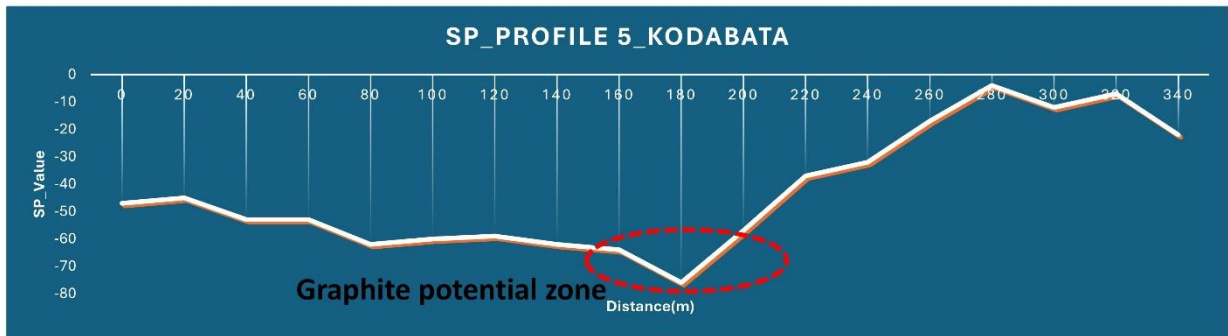
Self-Potential Survey

The profile variation of SP anomaly data has also demarcated the possible potential graphite anomaly zones in red dotted area as shown in Fig.6.2.3. The total SP anomaly map for Zone-A has shown SP anomaly value ranges from -240 mV to 7 mV with an average SP anomaly value -74 mV. The total SP anomaly map for Zone-A reveals a potential concealed graphite body in the central western part of the area (Fig.6.2.4) indicated by blue anomaly zones corresponding to negative SP anomaly values ranging from -240mV to -114 mV (Fig.6.2.4). The residual SP anomaly map highlights shallow surface graphite bodies as smaller patches in the eastern side of the area trending from SE-NW. The AA1 and BB1 are the strike directions of shallow surface graphite potential zones. AA1 has a direction of NW-

SE and BB1 has its perpendicular direction. AA1 has a length of 290m and BB1 has a length of 257m (Fig.6.2.5). Euler depth solutions derived from the total SP anomaly map indicate that the most frequent depth values in the graphite potential zone range between 24-66 m and (Fig.6.2.6). The inclined borehole locations are overlaid on Fig.6.2.4 for validation of the results. The borehole results are well corroborated with our SP data analysis in terms of depth range and concealed locations of graphite potential zones.

The Total Magnetic anomaly map for Zone-A (Fig.6.2.7) reveals that the magnetic field intensity ranges between -173 nT and -126 nT. This narrow range indicates a likely absence of highly magnetic minerals or rocks within the area. These negative anomalies strongly suggest that the region is predominantly composed of non-magnetic rocks, which are conducive to graphite mineralizations. Graphite and its host rocks typically produce negative magnetic anomaly.





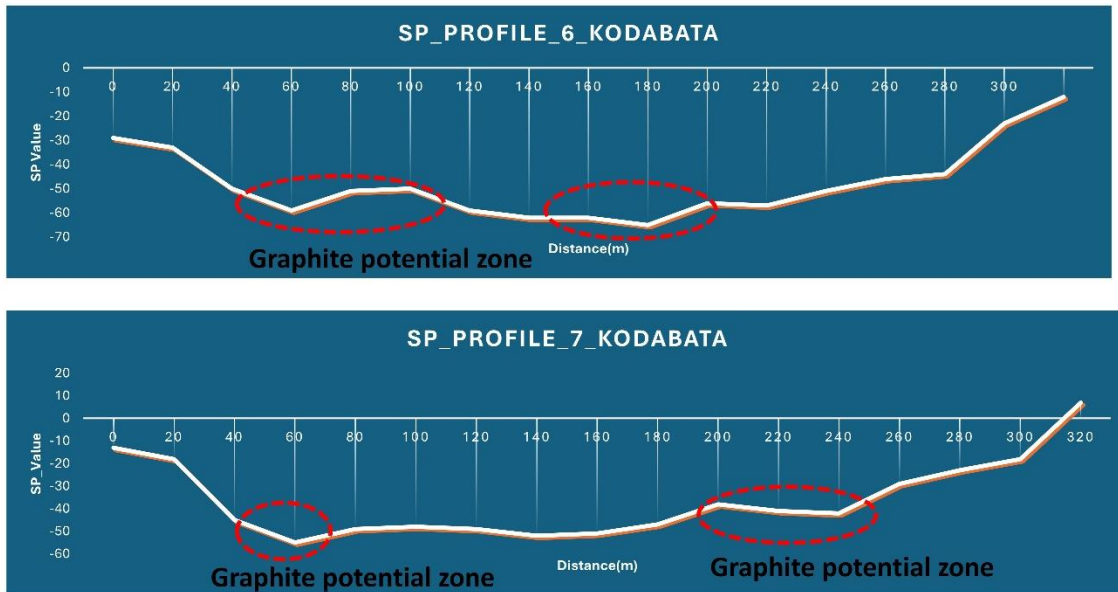


Fig.6.2.3- Profile plot of SP anomaly values along the seven profiles in Zone-A. The possible graphite potential zones are marked by red dotted polygons.

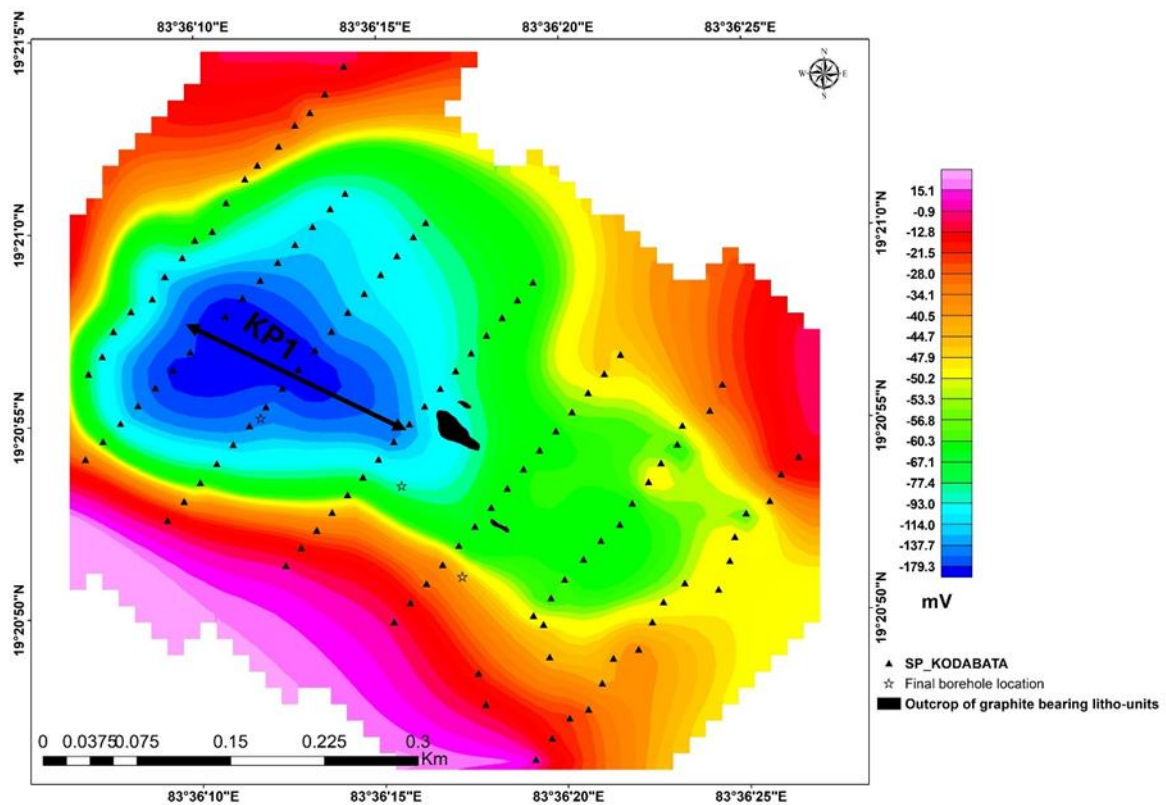


Fig.6.2.4- Total SP anomaly map for the Zone-A near Kodabata village. KP1- is the possible deeper concealed graphite potential zone

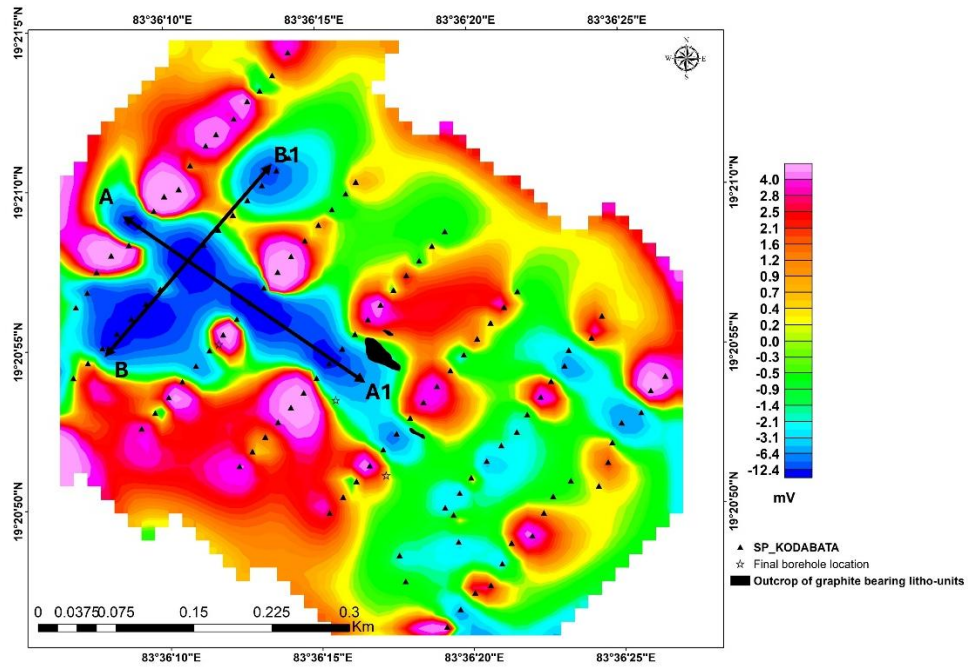


Fig.6.2.5- Residual SP anomaly map for the Zone-A near Kodabata village. AA1 and BB1 are the possible strike and the possible deeper concealed graphite potential zone respectively

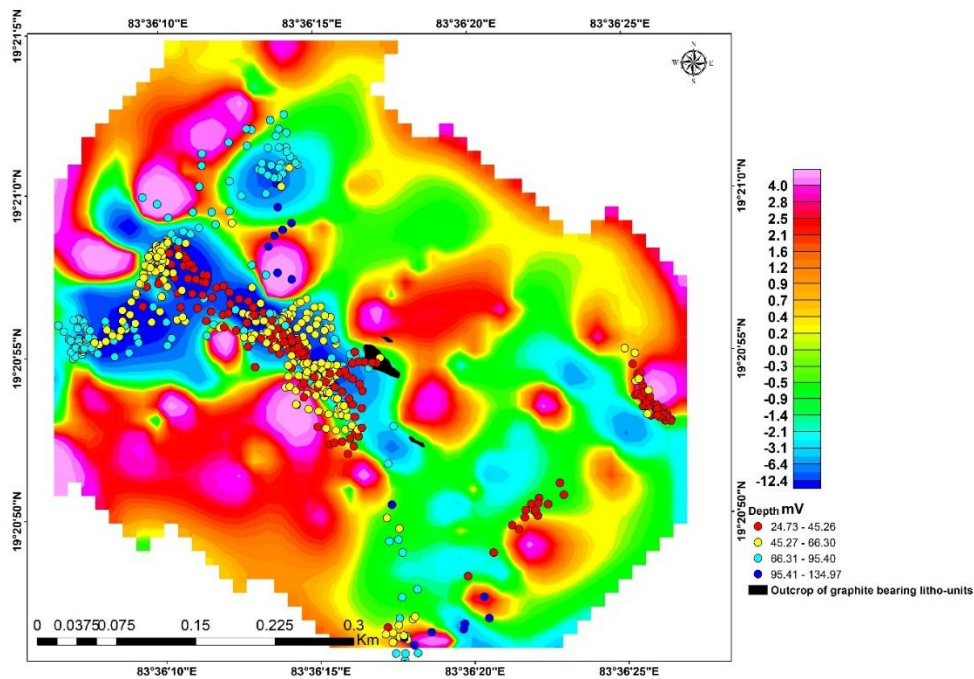


Fig.6.2.6- The 3D Euler depth solution of the SP anomaly data overlaid on the residual SP anomaly map for zone A

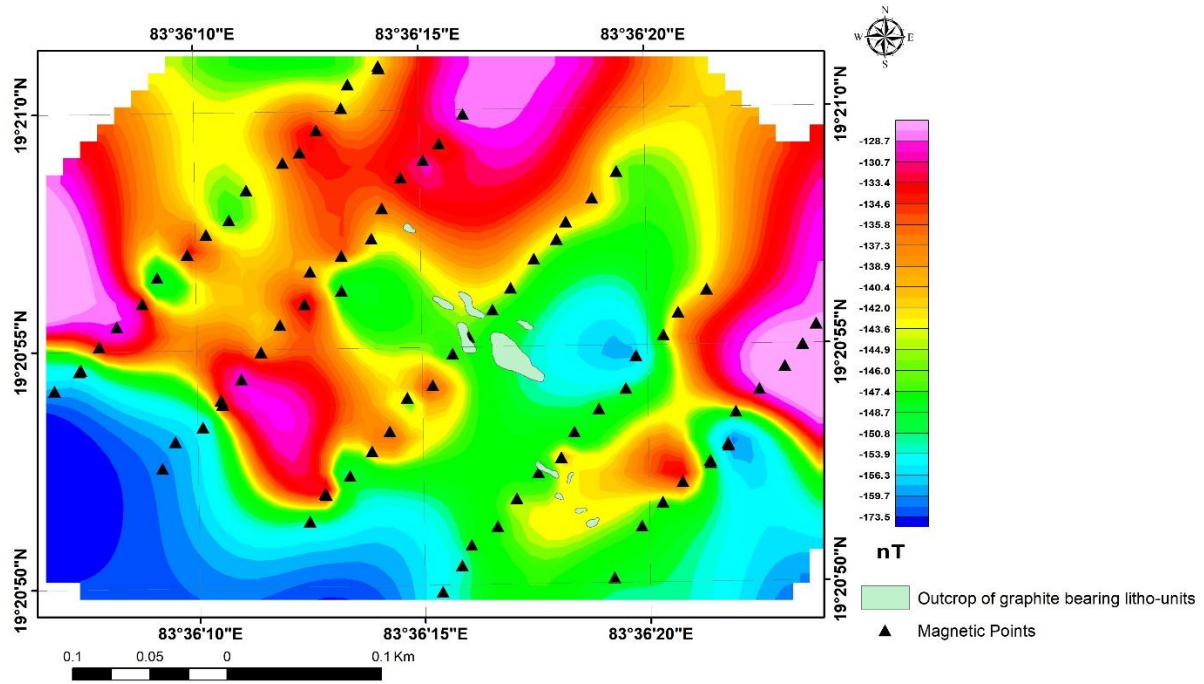


Fig.6.2.7- IGRF corrected total magnetic anomaly map for zone A.

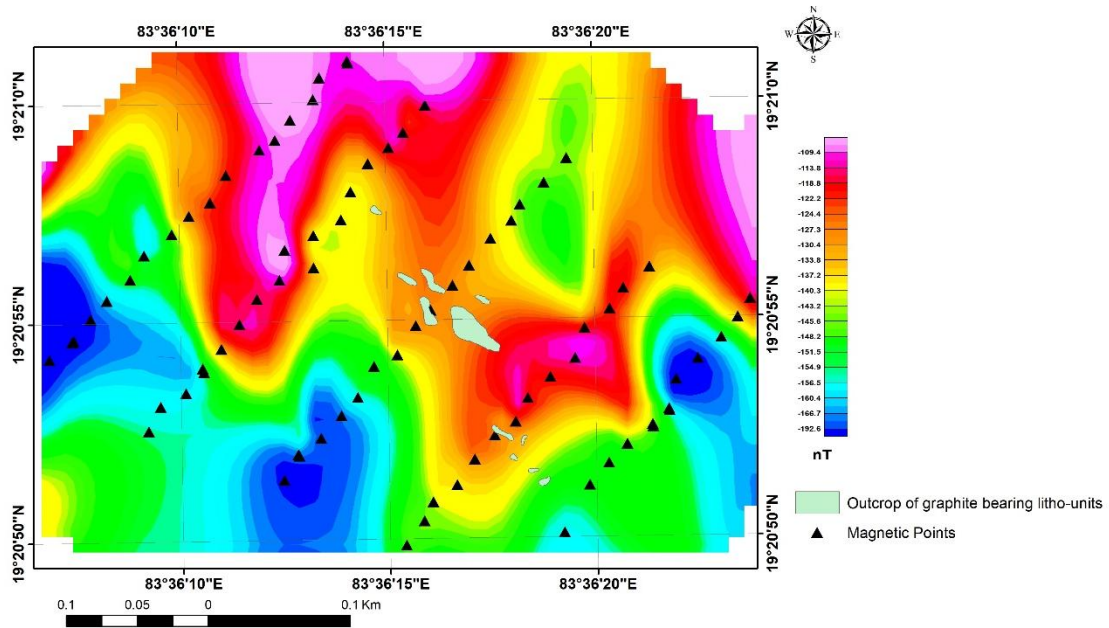


Fig.6.2.8 -RTP of total magnetic anomaly map for zone A.

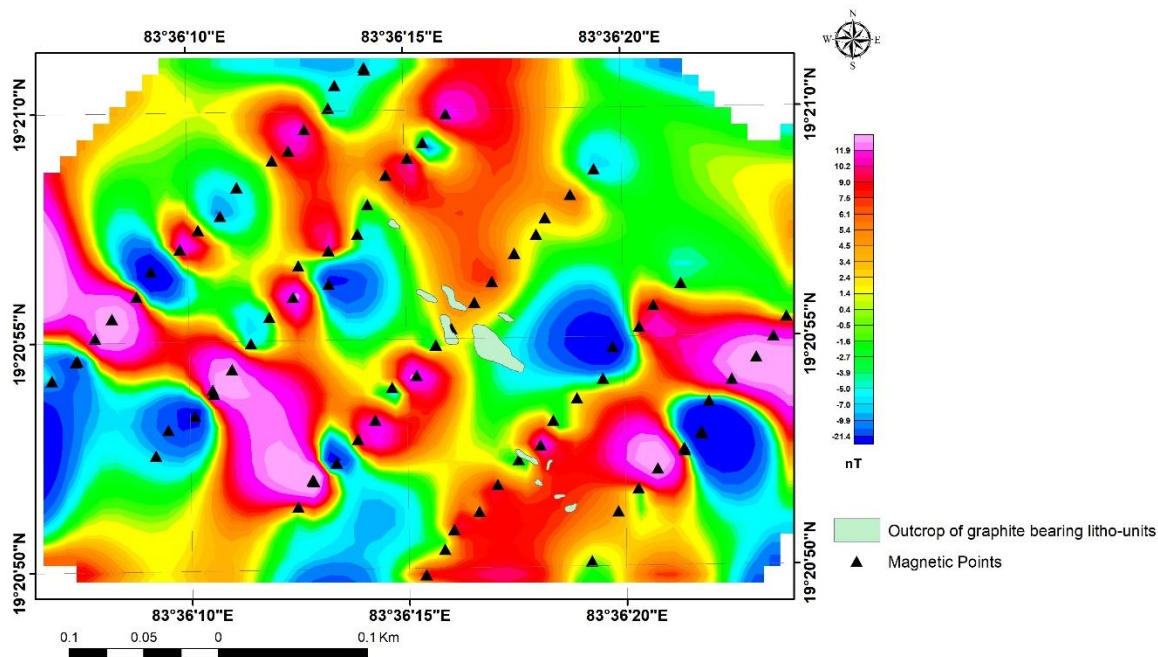


Fig.6.2.9- Residual magnetic anomaly map for zone A

To improve the interpretation, a comparative analysis between graphite outcrops and self-potential (SP) anomalies was conducted, revealing a strong spatial association between low magnetic anomalies and known graphite occurrences. This correlation is particularly pronounced in the northwestern corner of the study area, reinforcing the potential for graphite mineralization in these zones. The Reduced to Pole (RTP) magnetic anomaly map displays values ranging from -192 nT to -109 nT, with a prominent low-anomaly zone observed in the southern region (Fig.6.2.8). The residual magnetic anomaly values range from -21 nT to 11 nT, with a series of low magnetic patches aligned along a southwest–northeast trend in the central portion of the area. These features likely indicate the presence of concealed granitic gneiss formations, which may host significant graphite mineralization (Fig.6.2.9).

Zone-B near Barangapadar

The profile variation of SP anomaly data has also demarcated the possible potential graphite anomaly zones in red dotted area as shown in Fig.6.2.10. The total SP anomaly map for Zone-B has shown SP anomaly value ranges from -114 mV to 22 mV with an average SP anomaly value -31 mV. The total SP anomaly map for Zone-B reveals a potential concealed graphite body in the north eastern part of the area (Fig.6.2.11) indicated by blue anomaly zones corresponding to negative SP anomaly values ranging from -114 mV to -108 mV (Fig. 11). The residual SP anomaly map highlights shallow surface graphite bodies with a larger single patche in circular shape with a 111 m diameter in the north eastern side of the area trending from NE-SW (Fig.6.2.12). The depth solutions derived using Euler 3D depth solutions the possible graphite potential zones are located in the depth range of 18 m to 54 m

(Fig.6.2.13).

The IGRF-corrected total magnetic anomaly map for Zone-B (Fig.6.2.14) indicates a magnetic field intensity ranging from -249 nT to -149 nT. The Reduced-to-Pole (RTP) anomaly map shows values varying between -281 nT and -129 nT (Fig.15). In contrast, the residual magnetic anomaly map displays a range from -26 nT to 19 nT (Fig.16).

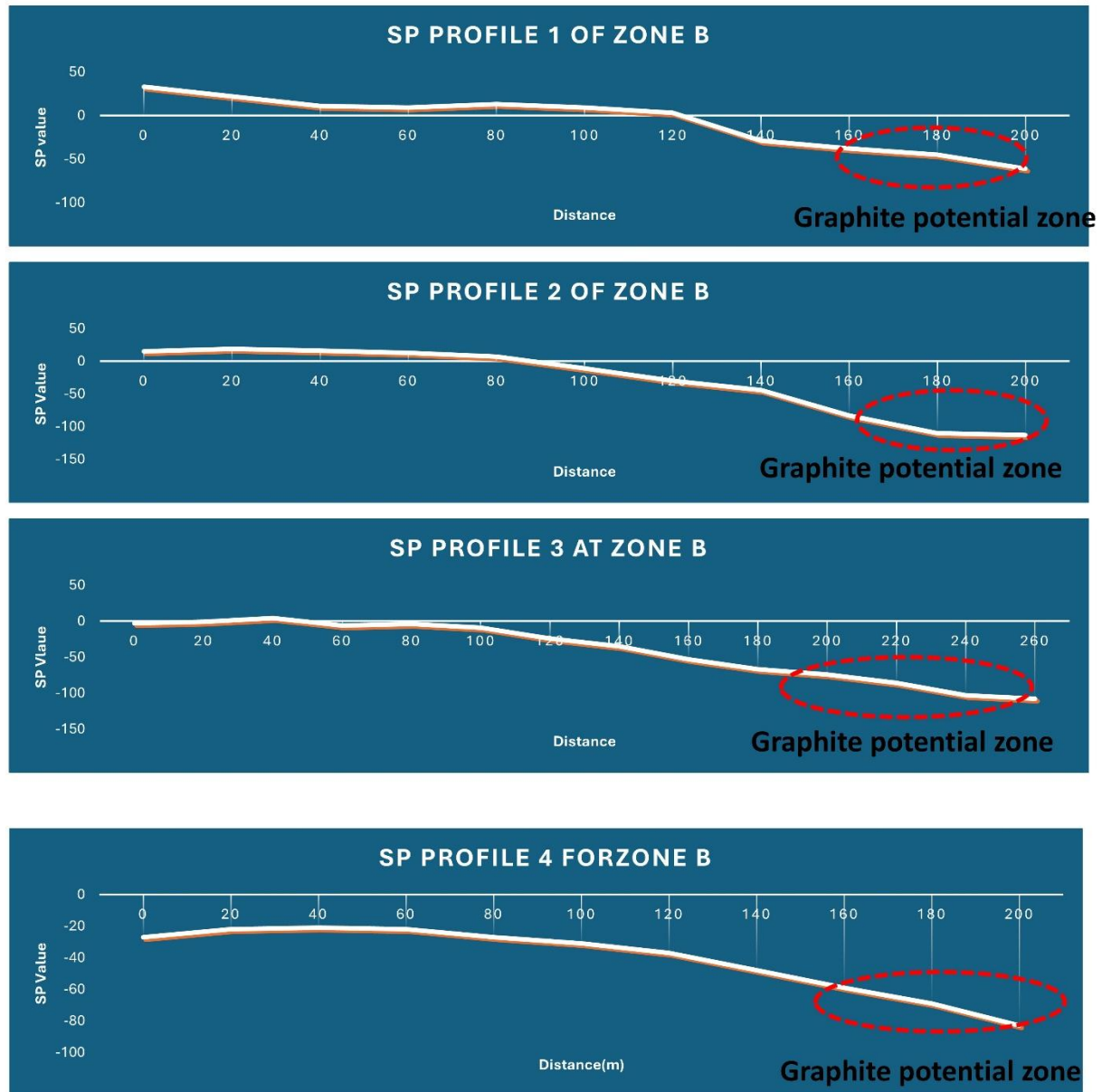


Fig.6.2.10- Profile plot of SP anomaly values along the seven profiles in Zone-B. The possible graphite potential zones are marked by red dotted polygons.

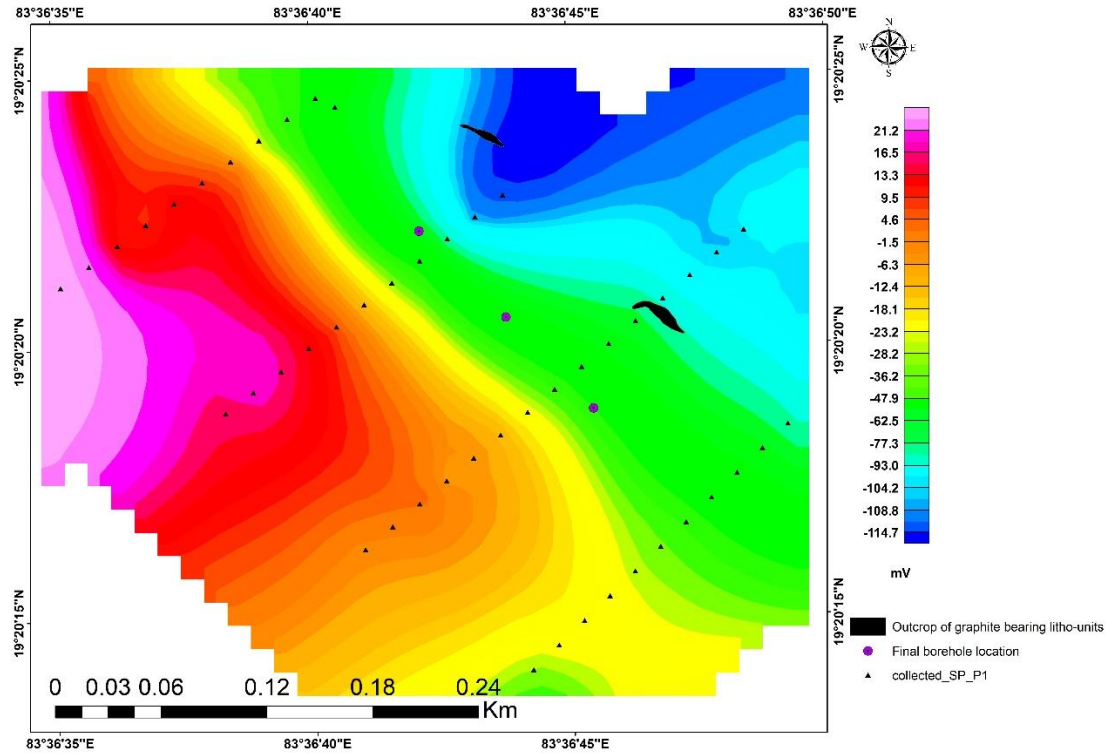


Fig.6.2.11- Total SP anomaly map for the Zone-B near Barangapadar village.

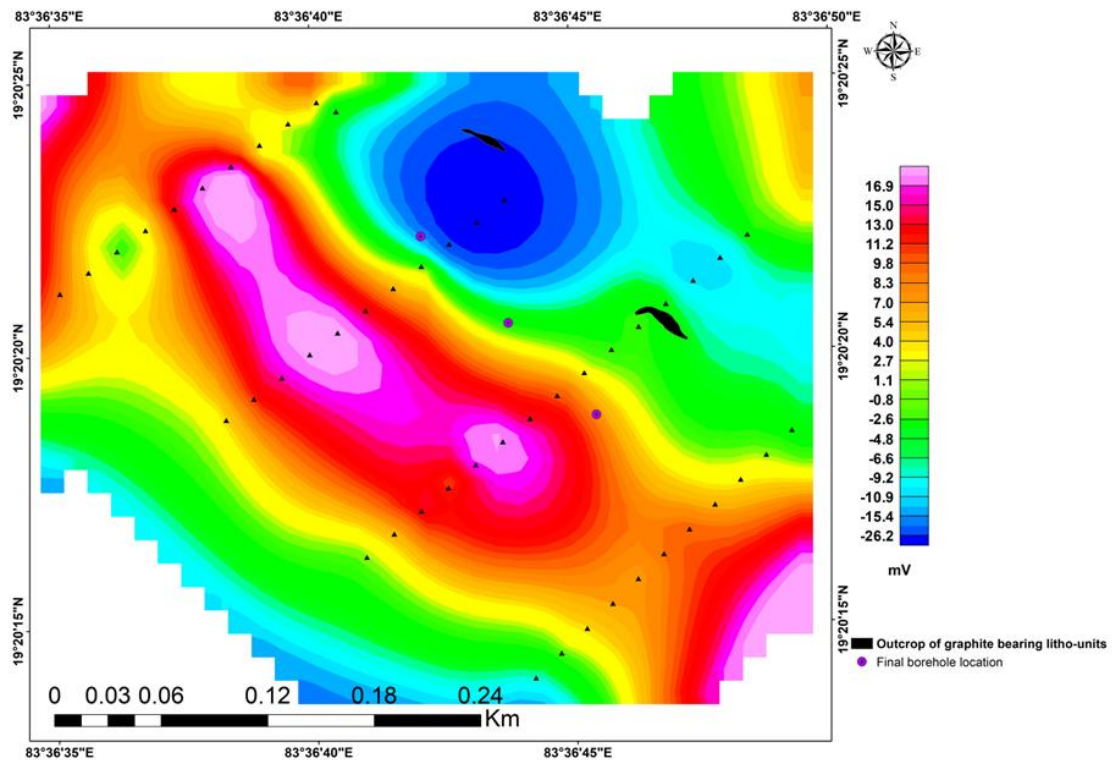


Fig.6.2.12- Residual SP anomaly map of Zone B

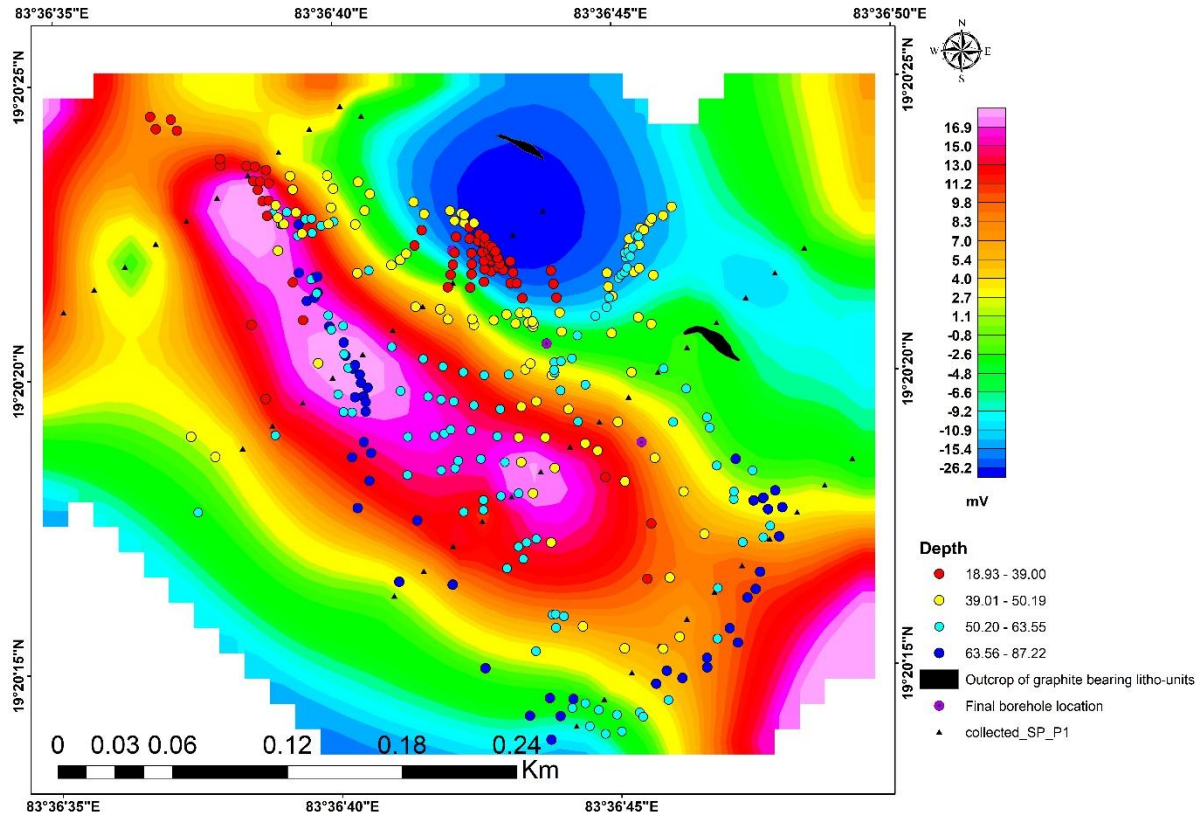


Fig.6.2.13- Euler depth solutions cluster of zone B

Magnetic Survey

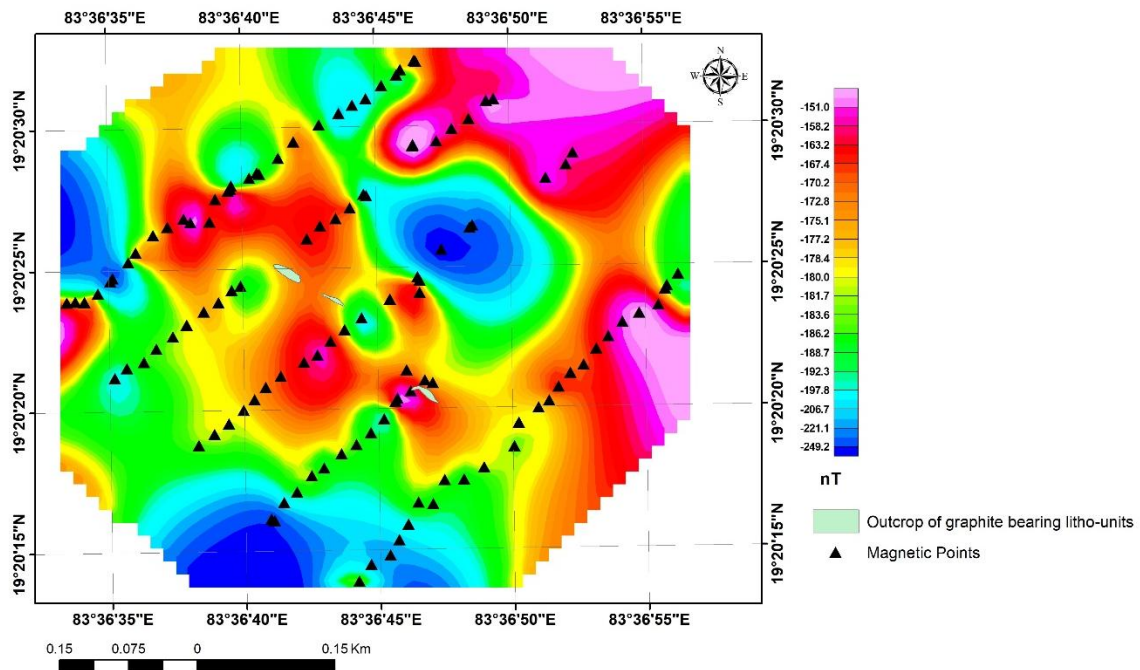


Fig.6.2.14- IGRF corrected magnetic anomaly map of zone B

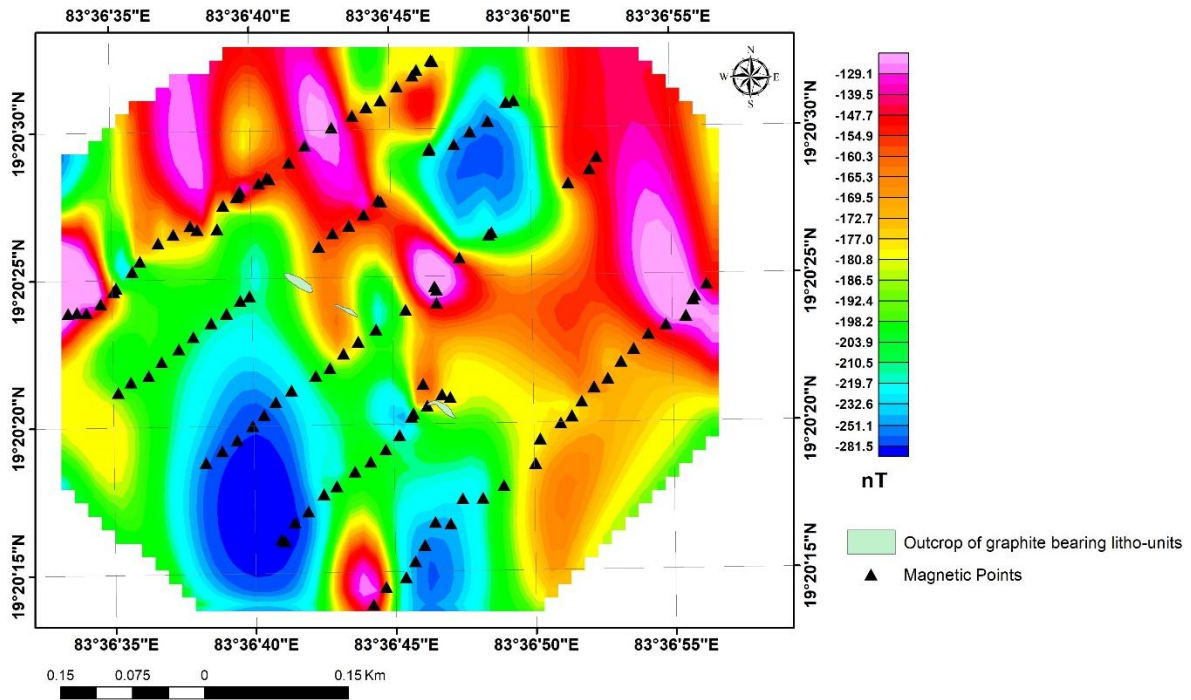


Fig.6.2.15- RTP magnetic anomaly map of zone B

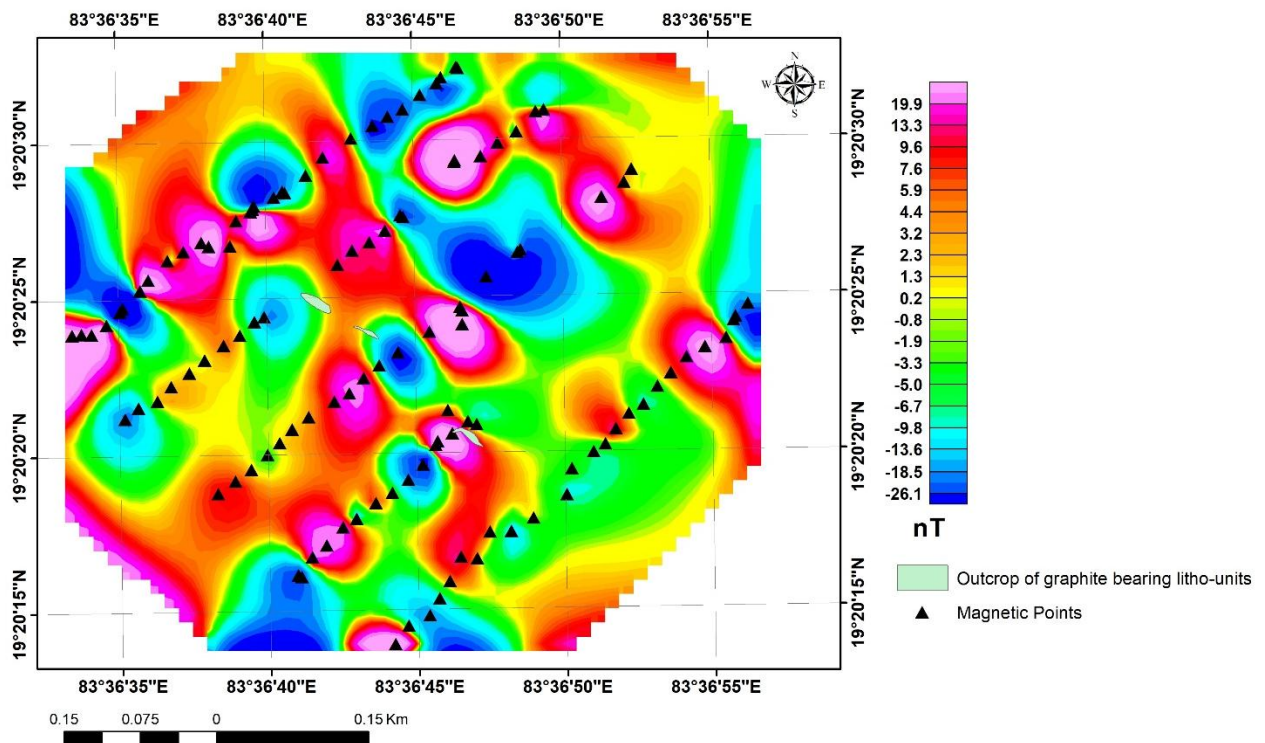


Fig.6.2.16- Residual magnetic anomaly map of zone B

The total magnetic intensity of the map shows an overall correlation with the SP anomaly map for zone B, and the low anomaly zones are well correlated spatially, which strengthens the study. Some spatial displacement of the correlation can be found due to the magnetometer's bipolarity effect.

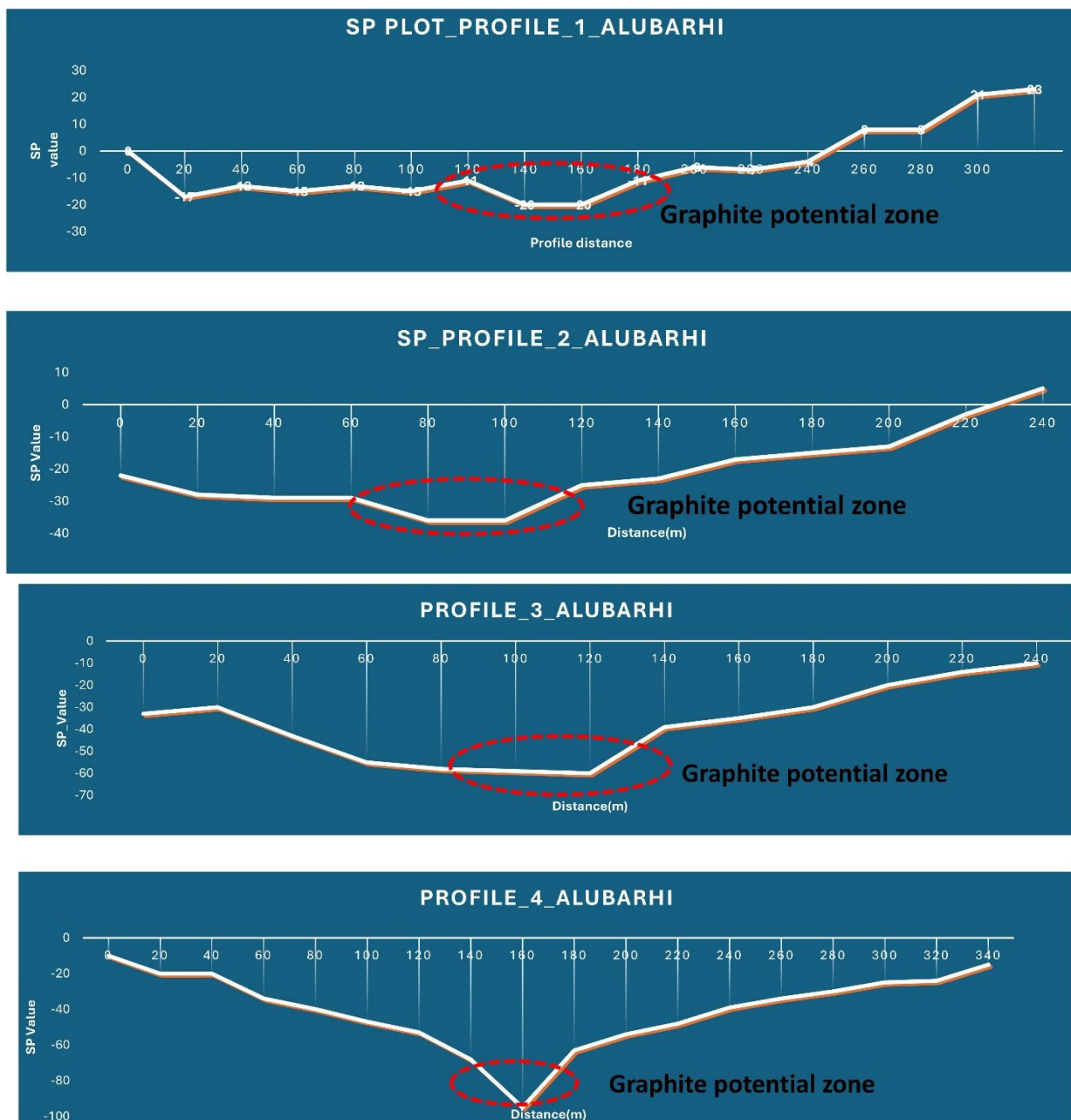


Fig. 6.2.17- SP profile plots of the Zone C near Alubarhi

The four SP profiles for Zone C have highlighted the graphite potential zones in the marked red dotted polygons. The most negative anomaly zones are marked in these profiles, interpreted as graphite potential zones. The total SP anomaly map has shown the variation of negative and positive anomaly over the zone C.

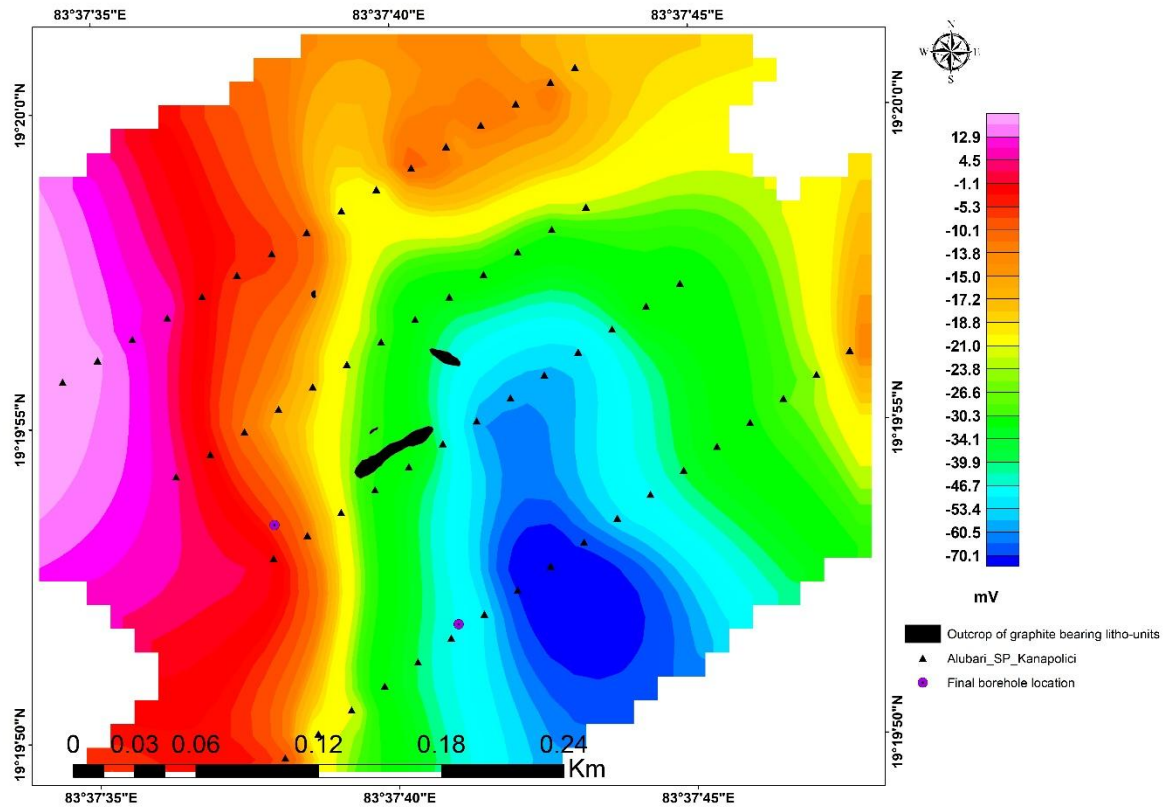


Fig.6.2.18- Total SP anomaly map for zone C

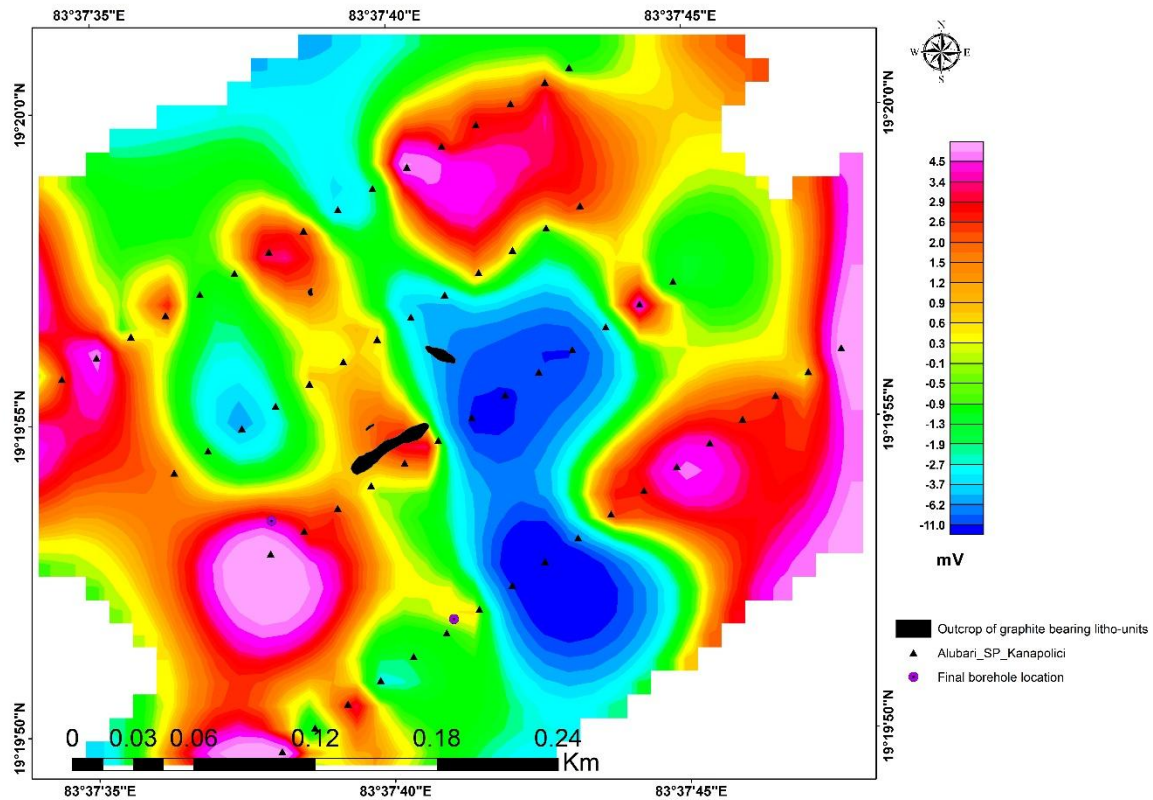


Fig.6.2.19- Residual SP anomaly map for Zone C

The total SP anomaly map for zone C shows the spatial variation of the SP anomaly over

zone C. The SP total anomaly value varies from -70 mV to 12.9 mV, while the residual SP anomaly value -11 mV to 4.5 mV. The total SP anomaly map has highlighted the graphite potential zone in the southern side with a SW-NE strike direction. This graphite potential zone has a strike length of 178m.

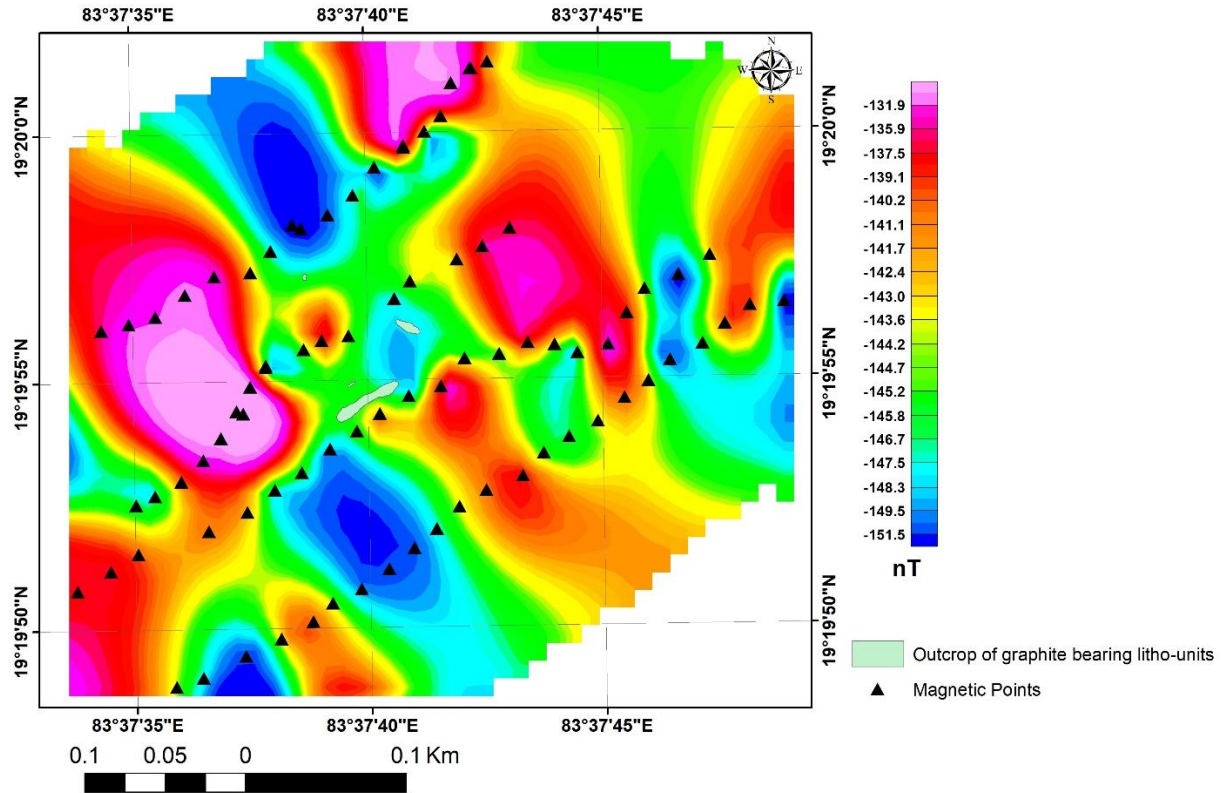


Fig. 6.2.20-IGRF corrected Total magnetic anomaly map for Zone-C

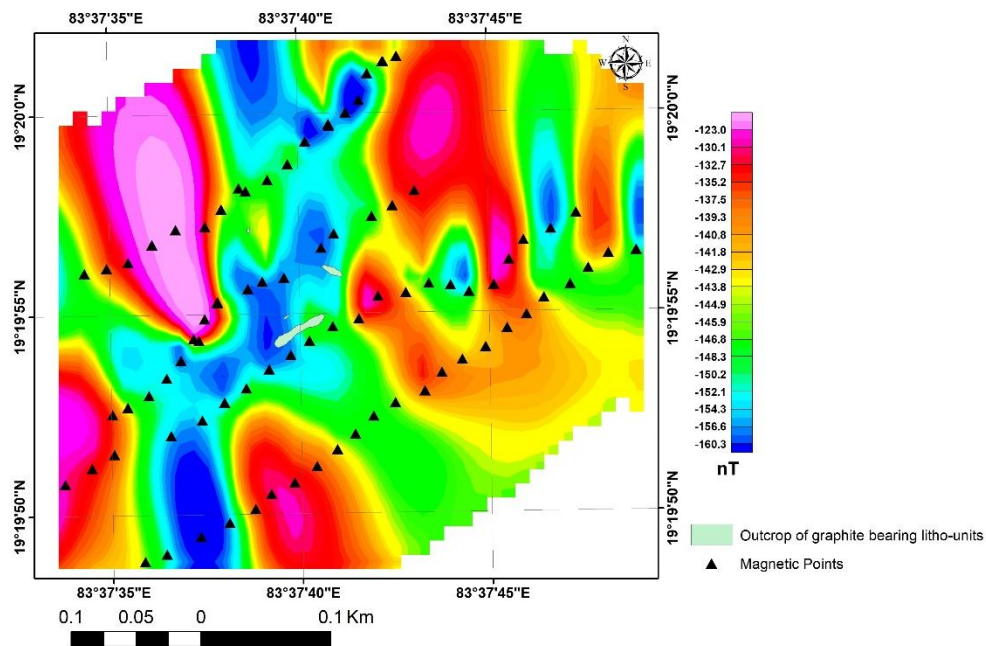


Fig.6.2.21- RTP anomaly map for the zone C

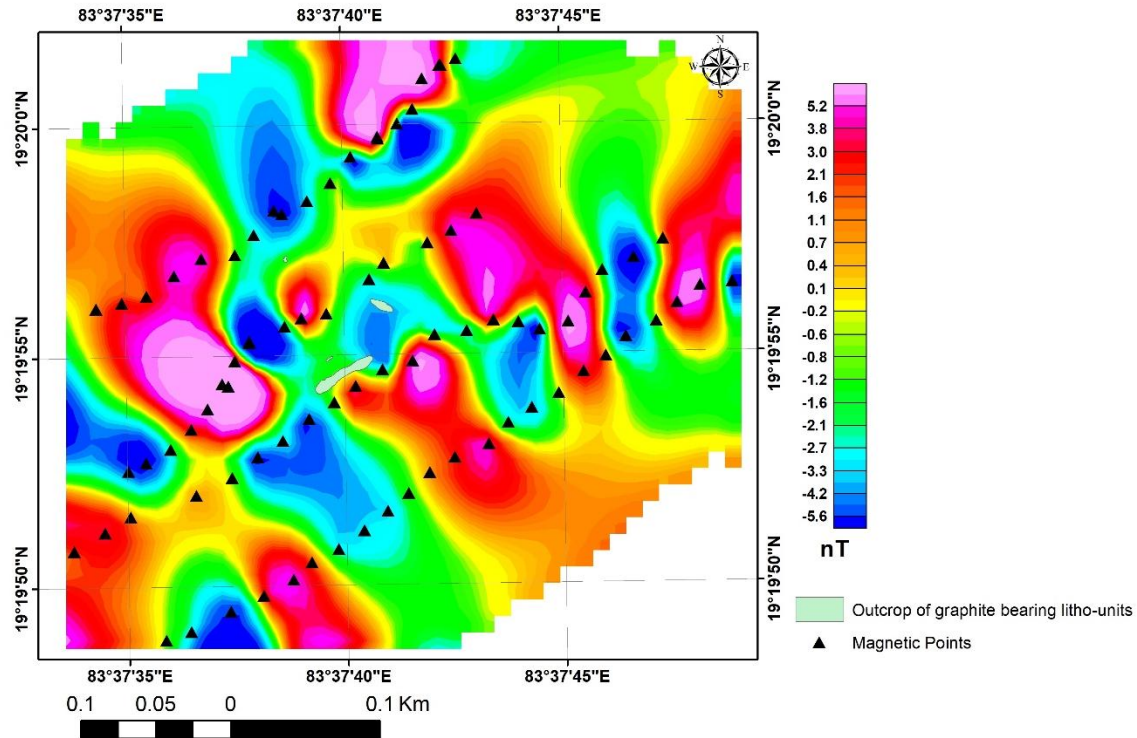


Fig.6.2.22- Residual magnetic anomaly map for the zone C

The total magnetic anomaly map (Fig.6.2.20) reveal significant magnetization contrasts among different lithological units. Notably, high anomaly zones—despite being negative—are likely associated with basic granulites, charnockites, and granite gneiss formations. The Reduced-to-Pole (RTP) magnetic anomaly map for Zone C indicates a predominantly unipolar magnetic character, enabling the identification of broader lithological units. A prominent NE–SW trending low magnetic (blue) zone in the central part of the map is interpreted as corresponding to graphite-rich host rocks. This zone is considered a potential target for Khondalite, a known graphite-bearing formation.

Furthermore, the residual magnetic anomaly map (Fig.6.2.22) highlights scattered patches of various major lithounits, including khondalite. However, the residual anomalies do not distinctly delineate lithological boundaries, suggesting that magnetic data alone may be insufficient for precise lithological discrimination in this area.

Conclusions

The integrated geophysical investigation, employing both magnetic and self-potential (SP) methods, proved highly effective in delineating graphite-bearing zones across three distinct localities—Kodabata, Barangapadar, and Alubarhi in the Kanapulisi block. The strike direction of the identified graphite zones varies by location: NW–SE in Kodabata, NE–SW in Zone B near Barangapadar, and again NW–SE in Alubarhi. This spatial variability in structural orientation suggests a complex deformation history, intricately linked to graphite mineralization. A semi-regional scale magnetic survey is recommended to further resolve these structural features.

SP anomaly profiles indicate broad low zones, which are likely corresponding to the strike continuity of concealed graphite bodies. Notably, a direct one-to-one correlation between magnetic and SP anomalies is absent, implying that magnetic methods alone may not effectively characterize the host lithology. However, they provide supplementary insights. The inferred depth of the concealed graphite zones ranges from approximately 20 to 60 meters, consistent with borehole data. This correlation validates the reliability and effectiveness of the integrated geophysical approach for graphite prospect delineation in the study area.

6.3 Geochemical sampling:-

The main objective of the geochemical sampling was to demarcate the graphite bearing lithological units with promising concentration preferably with (F.C)>2% to establish the major zones of interest.

Planning and preparation:-

- Firstly the graphite bearing zones were identified during the traverse mapping.
- Proper strike & dip of the area were measured carefully to establish the zone of interest.
- The identical outcrops within those zones were joined based on their extension as well as similarity to trace the surface length & width.
- Groovelines were planned accordingly, which were taken perpendicular to the strike length of the ore bodies to mark the actual width of the exposures.
- Also in some places we followed the groove line along the strike to connect the exposure of the ore body.

Methodology:-

Bedrock Sampling:-

Groove lines were systematically placed across various graphite-bearing zones in the study area to collect fresh samples. These groove lines were oriented perpendicular to the strike of the graphite-bearing lithological units.

1. The graphite-bearing exposures were first thoroughly cleaned to remove any unwanted material.
2. A set of parallel lines were marked along the groove line using lime.
3. The inner section of the groove was excavated to a consistent width and depth using a hammer and chisel.
4. Fresh graphite-bearing samples were then collected from the groove line continuously with 1m interval.
5. The collected samples were carefully placed in plastic bags, properly labeled with tags, and sent to the laboratory for analysis.

A total of 100 groove samples were collected in the mapped area. These were collected from 14 groove lines across 7 different graphite-bearing zones.

The detailed information of the groove samples is presented in (Table 1).

CHAPTER-7

INTEGRATION OF GEOLOGY, GEOPHYSICS & GEOCHEMICAL EXPLORATION DATA AND INTERPRETATION

The zone wise integration of geology, geophysics and geochemical exploration is given below-

Zone-A

Two groove lines were placed to collect graphite-bearing bedrock samples from exposed graphite bearing outcrops. The weighted average of fixed carbon (FC %) for the samples from these two groove lines were 10.2% and 5.67% respectively. These (F.C) values of groove lines were correlated with surface potential (SP) anomaly zones, bounded by SP contours ranging from -90 mV to -110 mV and -70 mV to -75 mV, respectively. Additionally, two intense SP anomaly zones, bounded by SP contours ranging from -210 mV to -235 mV, were identified to the northwest of the established groove lines. These anomalies are potentially indicative of subsurface graphite-bearing lithological units.

Zone-B

Samples collected from two groove lines yielded weighted average of fixed carbon (FC) percentages of 9.99% and 6.47%, respectively. These FC % of groove samples were correlated with surface-potential (SP) anomaly zones bounded by SP contours ranging from -85 mV to -90 mV and -80 mV to -85 mV respectively.

Zone-C

A weighted average of the fixed carbon (FC) percentage of 2.02% was correlated with surface potential (SP) anomaly zones bounded by SP contours ranging from -25 mV to -40 mV. Additionally, a prominent SP anomaly zone, bounded by contours greater than -90 mV was identified to the south-eastern side of the established groove line. These anomaly zones are potentially indicative of subsurface graphite-bearing lithological units.

CHAPTER-8

MINERAL PROSPECT

8.1 Surface indication

The surface indication of graphite was encountered in the nala sections and its branches where the sediments of recent days found mineralized. These water bodies contain flakes of graphite, although not in-situ but it gives an overall idea of the nearby outcrops or topography which can be traced.

The major nalas are flowing along the zone of disturbances or lithological transition boundaries where graphite ore is expected.

Two types of graphite mineralization were encountered in the block:-

- a) Disseminated type
- b) Quartzo-feldspathic graphite gneiss type

In situ outcrops of quartzo-feldspathic graphite gneiss were identified near Kodabata, Alubarhi and Tala Barangapadar villages, particularly along nala sections and paddy fields on the hills. Disseminated graphite flakes were encountered in khondalite near Upara Barangapadar and Barhapulisi village. Additionally, minor concentrations of graphite flakes were identified in granite gneiss near Durgi and Chakrigurha villages.

8.2 Mode of occurrence

In the proposed block, there are two types of mode of occurrences of graphite, which are as follow-

- Disseminated type
- Gneiss type

Disseminated type -

In this type of mode of occurrence graphite flakes are disseminated throughout the host rock. The flakes show parallel alignment to the foliation of the host rock. Granite gneiss with graphite (Near Chakrigurha and Northern part of Durgi) and khondalite (Near Barhapulisi and Upara Barangapadar village) are the principal lithological units which show such type of mineralization.

The chemical analysis report (Annexure I) shows such types of mineralization are found to be not encouraging (Less than 2% F.C.).

Gneiss type mineralizations-

In this type of mineralization the graphite rich layers alternate with the quartz-feldspar rich layer define the gneissosity of the litho-unit. Such type of mineralization were found near Kodabata, Tala Barangapadar and Alubadi villages.

The chemical analysis report (Annexure I) shows such types of mineralization are

encouraging (Greater than 2% F.C.) in nature and of high values (Up to 10.64 % F.C).

8.3 Details of mineralization

Potential surface geological evidences for the existence of graphite were observed in three graphite bearing zones from A to C. The principal graphite bearing litho-units exposed on the surface are quartzo-feldspathic graphite gneiss, khondalite with graphite and granite gneiss with graphite. Chemical analysis results for the samples collected from the graphite bearing litho-units were showing encouraging values of > 2% F.C). The detailed descriptions of the major graphite bearing zones are described under section 6.1.7.

8.4 Genesis of mineralization

The graphite mineralisation was found to occur as quartzo-feldspathic graphite gneiss, granite gneiss with graphite and khondalite with graphite associated with khondalite group of rock and granite gneiss. It was also noticed that the graphite mineralisation was associated with the development of pyrite crystals.

The co-existence of graphite and pyrite is possibly due to common origin from organic rich sediment under high temperature regional metamorphism in deep marine reducing environment. But the organic origin can be confirmed after carbon isotope analysis.

CHAPTER-9

EXPLORATION BY SCOUT DRILLING

In pursuance of **NMET-mineral exploration project F. No. 23/412/2023-NMET/390**, exploratory drilling of 500 m was carried out in 8 numbers of 1st level boreholes (30m vertical depth of intersection) planned based on surface geological and geophysical evidences in order to investigate the existence of graphite up to 30 m vertical depth in three different graphite bearing zones. The spacing between two adjacent boreholes is 124 m or less, depending upon the occurrences of surface evidences. The graphite mineralization belongs to type-I (Crystalline graphite) category of Ramsdell classification. Drilling was commenced on 07th December 2024 and completed on 24th February, 2025. As per the MEMC rules the exploration in the graphite bearing zones of Kanapulisi block is covered by G-4 stage and the resources are categorized under UNFC class 334.

9.1 Methodology of drilling

The dips of ore bodies varies from 50° to 60° in different graphite bearing zones, inclined core borehole were planned to be drilled in order to intersect the graphite bodies at 30 m vertical depth. The inclination angle of every borehole is 45° with respect to the horizontal surface.

9.2 Borehole planning

Two types of surface data were considered for planning boreholes which are the surface geological evidence and geophysical evidence.

Borehole planning based on Geological evidence

The outcrops of graphite where analytical results found to be greater than 2 % were considered as the reference location for placing boreholes in order to intersect at 30 m vertical depth. Five numbers of boreholes namely as KKBH-1, KKBH-2, KTBH-1, KTBH-2 and KABH-1 were planned on the basis of geological consideration.

Borehole planning based on Geophysical evidence

When surface geological evidence was not prominent to take as reference point, the centre point of maximum SP anomaly zones was considered as the reference point to intersect at 30 m vertical depth by placing boreholes at inclination of 45°. Three numbers of boreholes namely as KKBH-3, KTBH-3 and KABH-2 were planned on the basis of geophysical consideration.

Table-9.1: Details of the zone wise borehole location

| Sl.no | Borehole number | Location information | Zone of graphite | Level of the borehole | Vertical depth | Azimuth | Inclination | Remarks |
|-------|-----------------|---------------------------|------------------|-----------------------|----------------|---------|-------------|--|
| 1 | KKBH-1 | Kodabata village | Z-4 | 1st level | 30 m | 40° | 45° | The borehole was planned on the basis of Geological evidence |
| 2 | KKBH-2 | Kodabata village | Z-4 | 1st level | 30 m | 40° | 45° | The borehole was planned on the basis of Geological evidence |
| 3 | KKBH-3 | Kodabata village | Z-4 | 1st level | 30 m | 40° | 45° | The borehole was planned on the basis of Geophysical evidence |
| 4 | KTBH-1 | Tala Barangapadar village | Z-2 | 1st level | 30 m | 40° | 45° | The borehole was planned on the basis of Geological and Geophysical evidence |
| 5 | KTBH-2 | Tala Barangapadar village | Z-2 | 1st level | 30 m | 40° | 45° | The borehole was planned on the basis of Geological evidence |
| 6 | KTBH-3 | Tala Barangapadar village | Z-2 | 1st level | 30 m | 40° | 45° | The borehole was planned on the basis of Geophysical evidence |
| 7 | KABH-1 | Alubarhi Village | Z-7 | 1st level | 30 m | 60° | 45° | The borehole was planned on the basis of Geological evidence |
| 8 | KABH-2 | Alubarhi Village | Z-7 | 1st level | 30 m | 60° | 45° | The borehole was planned on the basis of Geophysical evidence |

Table 9.2: Strike specing of boreholes

| Sl.no | Boreholes | Location information | Zone of graphite | Distance between boreholes along the strike | Remarks |
|-------|-------------------------|---|------------------|---|---|
| 1 | KKBH-1, KKBH-2 & KKBH-3 | Northern part of Kodabata village | Z-4 | (KKBH-1&2 = 86.76m) (KKBH-1&3=124.85m) | Borehole sequences were named based on priority w.r.t surface evidence. |
| 2 | KTBH-1, KTBH-2 & KTBH-3 | South-Western part of Tala Barangapadar village | Z-2 | (KTBH-1&3 = 70.97m) (KTBH-2&3=69.24m) | |
| 3 | KABH-1 & KABH-2 | South eastern part of Saharha village | Z-7 | (KABH-1&2 = 100.26m) | |

Table 9.3: Details of the drilled boreholes

| Sl.no | Borehole number | Latitude (gps) | Longitude (gps) | Rl. of collar | Azimuth | Inclination | Date of commencement | Closing depth of borehole (in metre) | Date of completion |
|-------|-----------------|----------------|-----------------|---------------|---------|-------------|----------------------|--------------------------------------|--------------------|
| 1 | KKBH-1 | 19°20'53.35'' | 83°36'15.48'' | 441 | 40° | 45° | 07.12.2024 | 65 | 12.12.2024 |
| 2 | KKBH-2 | 19°20'50.96'' | 83°36'17.11'' | 431 | 40° | 45° | 18.12.2024 | 57 | 22.12.2024 |
| 3 | KKBH-3 | 19°20'55.15'' | 83°36'11.65'' | 448 | 40° | 45° | 12.12.2024 | 60.5 | 15.12.2024 |
| 4 | KTBH-1 | 19°20'18.80'' | 83°36'45.40'' | 449 | 40° | 45° | 24.12.2024 | 65 | 02.01.2025 |
| 5 | KTBH-2 | 19°20'22.10'' | 83°36'42.00'' | 450 | 40° | 45° | 07.01.2025 | 66.5 | 12.01.2025 |
| 6 | KTBH-3 | 19°20'20.50'' | 83°36'43.72'' | 448 | 40° | 45° | 02.01.2025 | 60.2 | 06.01.2025 |
| 7 | KABH-1 | 19°19'53.45'' | 83°37'37.91'' | 506 | 60° | 45° | 14.01.2025 | 60 | 21.01.2025 |
| 8 | KABH-2 | 19°19'51.82'' | 83°37'40.90'' | 515 | 60° | 45° | 22.01.2025 | 65.8 | 24.01.2025 |

BOREHOLE: KKBH-1

The borehole KKBH-1 (Plate-III) was planned on the major graphite bearing zone-A to intersect the graphite band which dips 60° towards 220° , exposed along the nala section with encouraging analytical results (Weighted average F.C. = 7.93 %). Hence, KKBH-1 was planned with inclination of 45° with an azimuth towards $N40^\circ E$ and at a horizontal distance of 63 m from the exposed graphitic band in order to check the depth persistence of the graphite band at 30 m vertical depth.

The inclined depth of the borehole was 65 m (Summarised lithological log sheet given in Annexure-II). Granite gneiss, garnetiferous quartzite, leptynite, biotite gneiss, quartzofeldspathic graphite gneiss, khondalite with graphite, graphite bearing quartzite and granite gneiss with graphite were intersected in the borehole.

A total nine numbers of graphite bearing bands with several partings with varying thicknesses (0.5 m to 13.8 m) encountered within the depth interval from 11m to 60m. The cross sectional view is shown in figure 9.1. The graphite mineralisation is found to occur along the transition zone between khondalite group of rocks and granite gneiss.

BOREHOLE: KKBH-2

The borehole KKBH-2 (Plate-III) was planned on the same major graphite bearing zone-A to intersect a graphite band (dipping 60° towards 220°), exposed along the nala section with encouraging analytical results (Weighted average F.C. = 7.67 %). With inclination of 45° azimuth towards $N40^\circ E$, KKBH-2 was placed at a horizontal distance of 45m from the exposed graphitic band in order to investigate the depth persistence of that exposed graphite band up to 30 m vertical depth.

The inclined depth of borehole was 57 m (Annexure-III). Lithological units namely as granite gneiss, garnetiferous quartzite, mafic granulite, biotite gneiss, quartzofeldspathic graphite gneiss and granite gneiss with graphite were encountered during drilling.

Four numbers of graphite bearing bands of thickness varying 2 m to 14.14 m with several meter partings in between every two bands were intersected at depth interval from 5.45 m to 52.86 m. The cross sectional view is shown in the figure 9.2.

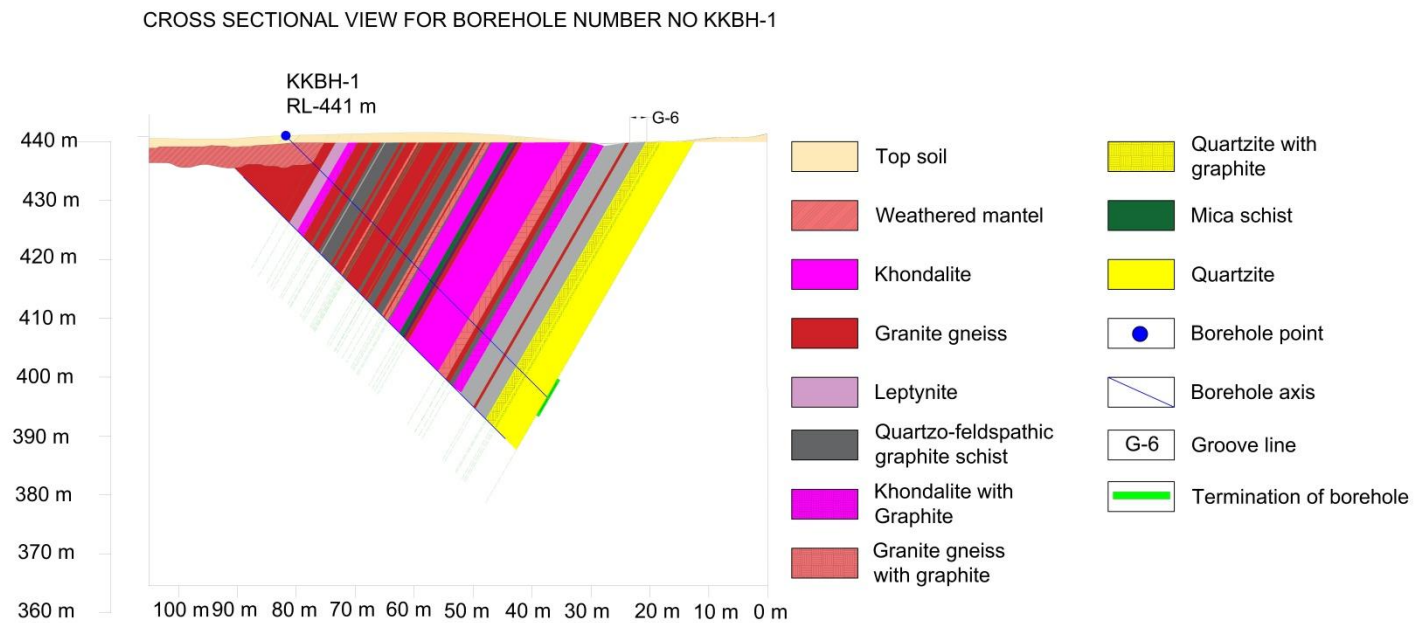


Figure 9.1: Cross sectional view of the borehole KKBH-1

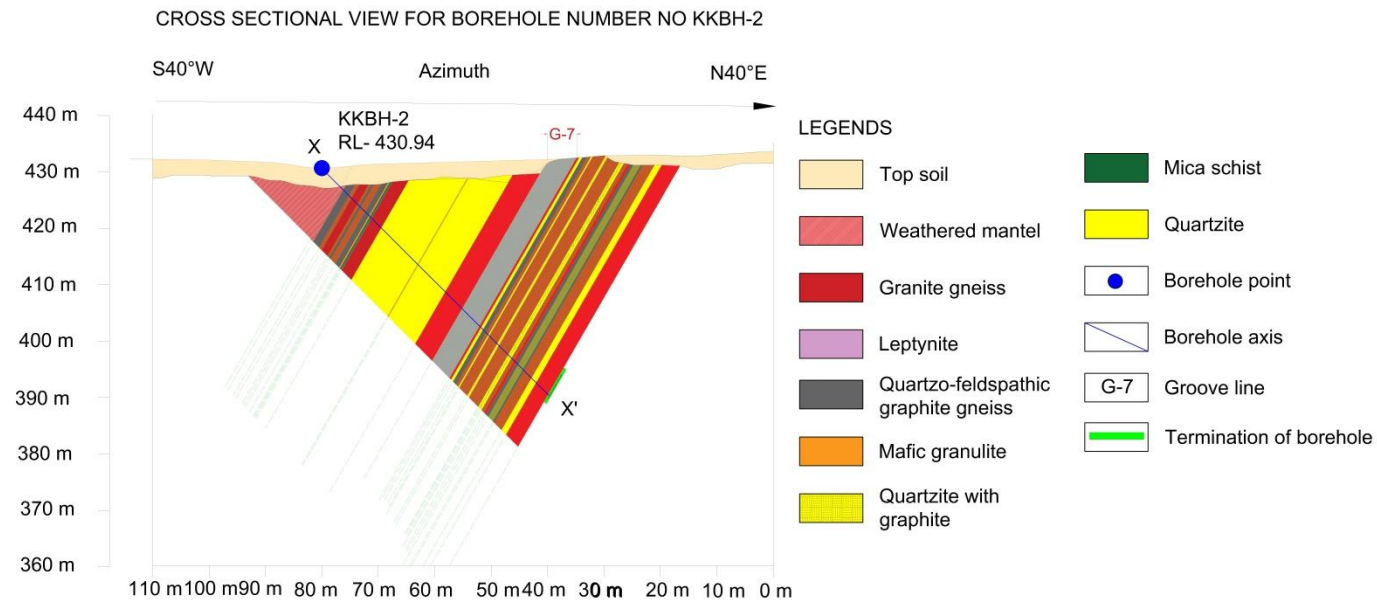


Figure 9.2: Cross sectional view of borehole KKBH-2

BOREHOLE: KKBH-3

The borehole KKBH-3 (Plate-III) was planned on the graphite bearing zone A in order to trace the occurrence of graphite bearing lithological units at 30m vertical depth of intersection with respect to the central point of maximum SP anomaly zone. The borehole was planned at a horizontal distance of 32m with respect to the central point of the SP anomaly zone.

The borehole was drilled up to an inclined depth of 60.5 m (Annexure-IV). Lithological units namely as granite gneiss, khondalite, garnetiferous quartzite, quartzo-feldspathic graphite gneiss and granite gneiss with graphite intersected in the borehole.

Two graphite bands were intersected at a depth interval of 47.8m to 49.83m with several partings. Thicknesses of the graphite bands varied from 1.75m to 6.9m. The cross sectional view is shown in fig.9.3.

BOREHOLE: KTBH-1

The borehole KTBH-1 (Plate-III) was planned on the same major graphite bearing zone-B to intersect the graphite band (dipping 50° towards 220°), exposed along the nala section with encouraging results (Weighted average F.C. = 9.99 %). With inclination of 45°, azimuth towards N40°E, KTBH-2 was drilled at a horizontal distance of 61 m from the exposed graphitic band in order to investigate the depth persistence of the exposed graphite band up to 30 m vertical depth.

The borehole was drilled up to inclined depth of 65 m (Annexure-V). Granite gneiss, khondalite, charnockite, garnetiferous quartzite, quartzo-feldspathic graphite gneiss khondalite with graphite and granite gneiss with graphite were intersected in the borehole.

Four numbers of graphite bearing bands of varying thicknesses from 1.25 m to 18.4 m with several meter partings, encountered within the depth interval from 18.17 to 62.8m (fig 9.4).

BOREHOLE: KTBH-2

The borehole KTBH-2 (Plate-III) was placed on the same major graphite bearing zone-B to intersect the graphite band (dipping 50° towards 220°), exposed along the nala section with encouraging results (Weighted average F.C. = 6.47 %). With inclination of 45°, azimuth towards N40°E, KTBH-2 was drilled at a horizontal distance of 61 m from the exposed graphitic band in order to investigate the depth persistence of the exposed graphite band up to 30 m vertical depth.

The borehole was drilled up to a depth of 66.5 m (Annexure-VI). Granite gneiss, khondalite, charnockite, quartzo-feldspathic graphite gneiss, khondalite with graphite and granite gneiss with graphite were encountered in the borehole.

Four numbers of graphite bearing bands of thicknesses varying from 0.5 m to 27 m with several meter partings inbetween every two bands were intersected within the depth interval from 18.5 to 65.63m (fig. 9.5).

BOREHOLE: KTBH-3

The borehole KTBH-3 (Plate-III) was planned on the graphite bearing zone B in order to investigate the occurrence of graphite bearing lithological units at 30m vertical depth with respect to the central point of maximum SP anomaly zone. The borehole was placed at a horizontal distance of 66 m with respect to the SP anomaly zone of value greater than -90 mV.

The borehole was drilled up to an inclined depth of 60.2 m (Summarised lithological log sheet given in Annexure-VII). Lithological units namely as granite gneiss, leptynite, khondalite, garnetiferous quartzite, quartzo-feldspathic graphite gneiss, khondalite with graphite and granite gneiss with graphite intersected in drilling.

A total 5 numbers of graphite bands intersected within the depth interval from 25.61m to 56.6m with several partings. Thickness of the graphite band varied from 0.5m to 5.44m (fig.9.6).

BOREHOLE: KABH-1

The borehole namely as KABH-1 (Plate-III) was planned on the same major graphite bearing zone-C to intersect a graphite band (dipping 60° towards 220°), exposed along a section of the hillock with encouraging results (Weighted average F.C. = 2.02 %). With inclination of 45°, azimuth towards N40°E, KTBH-2 was planned at a horizontal distance of 49 m from the exposed graphitic band in order to investigate the depth persistence of that exposed graphite band at a 30 m vertical depth of intersection.

The borehole was drilled upto inclined depth of 60 m (Annexure-VIII). Khondalite, charnockite, garnetiferous quartzite and khondalite with graphite were intersected in the borehole.

Four numbers of graphite bearing bands of thickness varying from 0.94 m to 2.18 m with several meter parting, encountered within the depth interval from 16.82 to 32m (Fig 9.7).

BOREHOLE: KABH-2

The borehole KABH-2 (Plate-III) was planned on the graphite bearing zone C in order to investigate the occurrence of graphite bearing lithological units at 30m vertical depth with respect to the central point of maximum SP anomaly zone. The borehole was planned at a horizontal distance of 31 m with respect to the central point of SP anomaly zone.

The borehole was drilled up to a depth of 65.8 m (Annexure-IX). Lithological units namely as granite gneiss, khondalite, garnetiferous quartzite, biotite gneiss, quartzo-feldspathic graphite gneiss and khondalite with graphite were intersected in borehole. A total 7 numbers of graphite bands were intersected at depth interval from 33.76m to 53.23m with several partings. Thickness of the graphite band varied from 0.5m to 7.89m (fig 9.8).

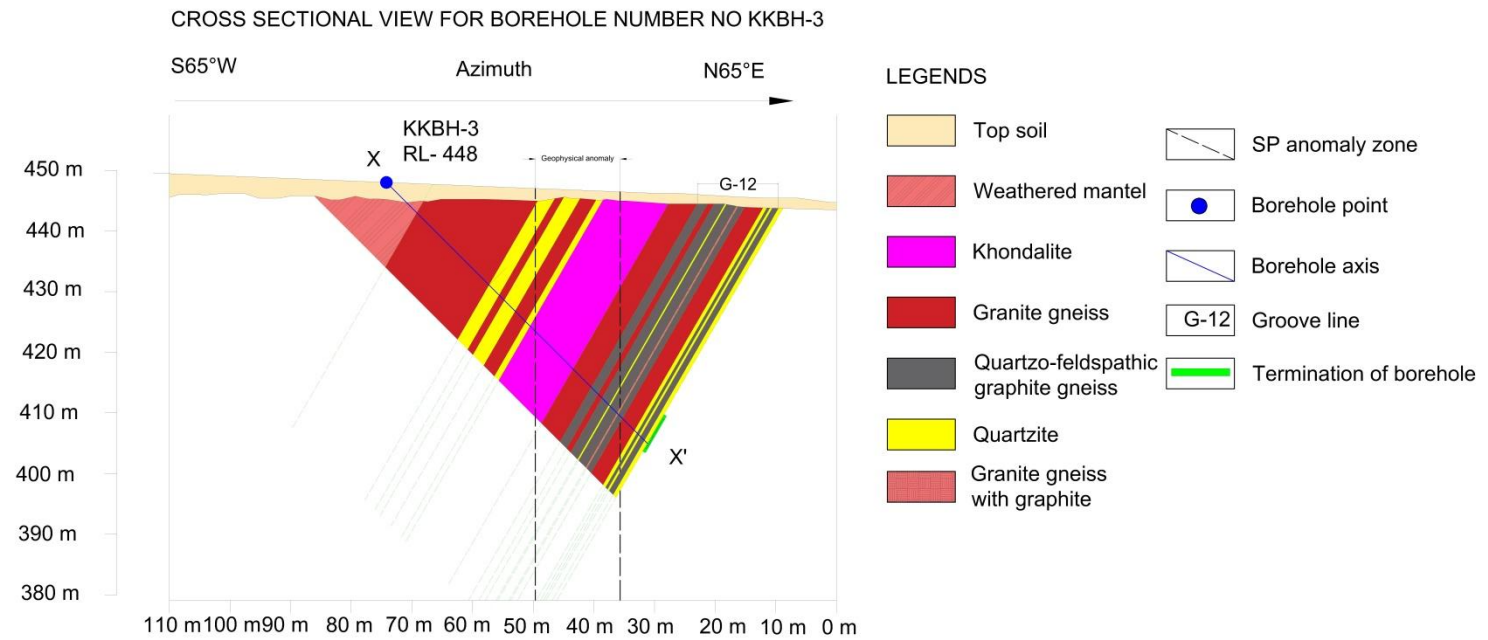


Figure 9.3: Cross sectional view of borehole KKBH-3

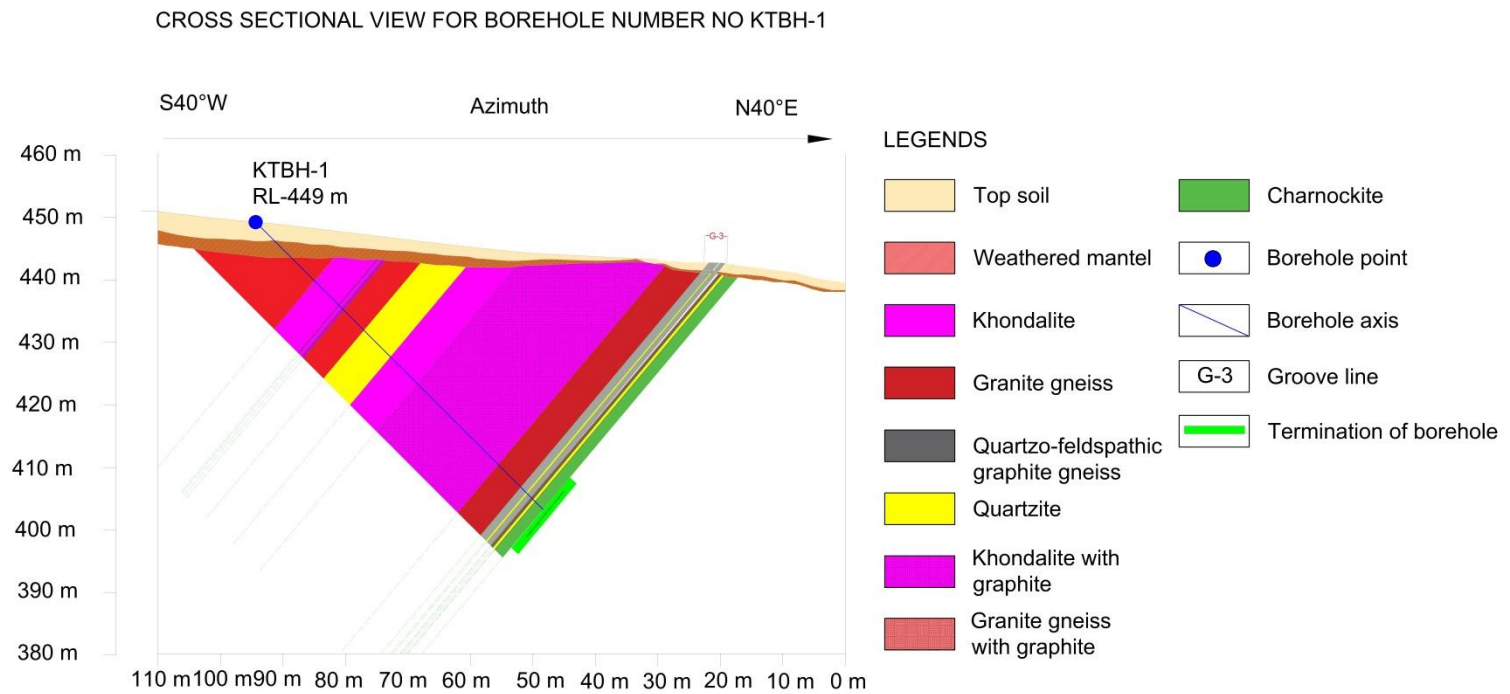


Figure 9.4: Cross sectional view of borehole KTBH-1

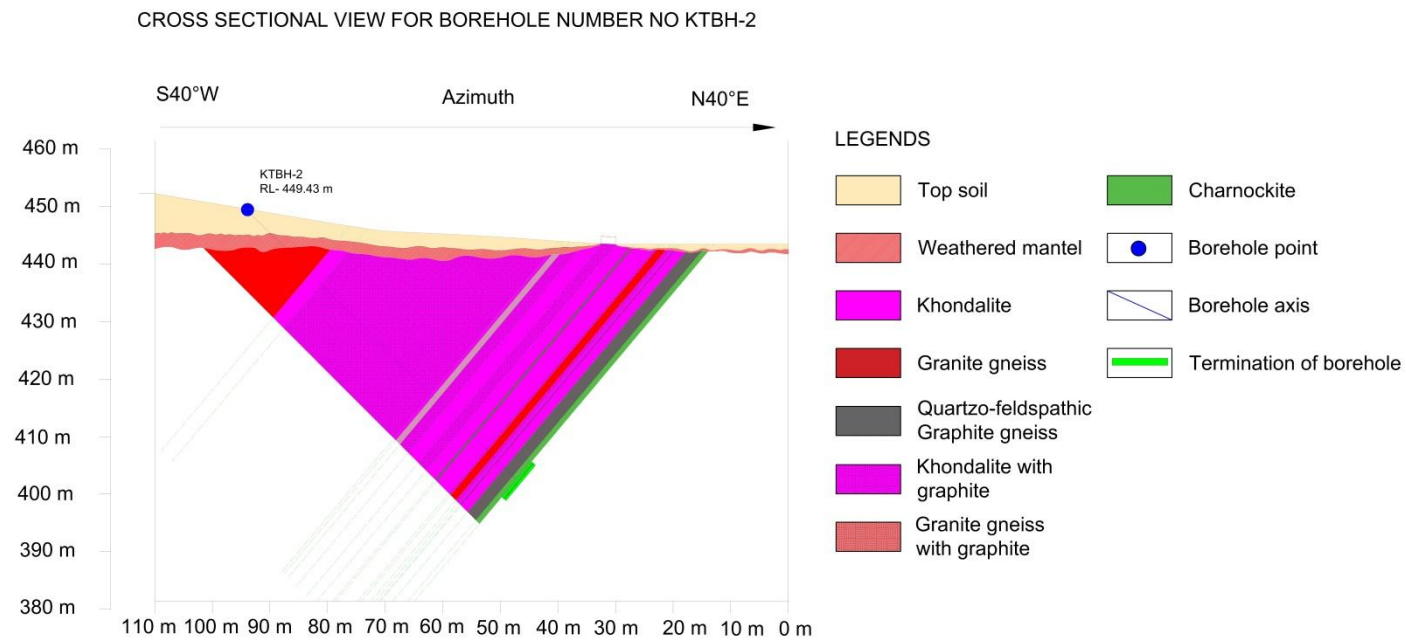


Figure 9.5: Cross sectional view of borehole KTBH-2

CROSS SECTIONAL VIEW FOR BOREHOLE NUMBER NO KTBH-3

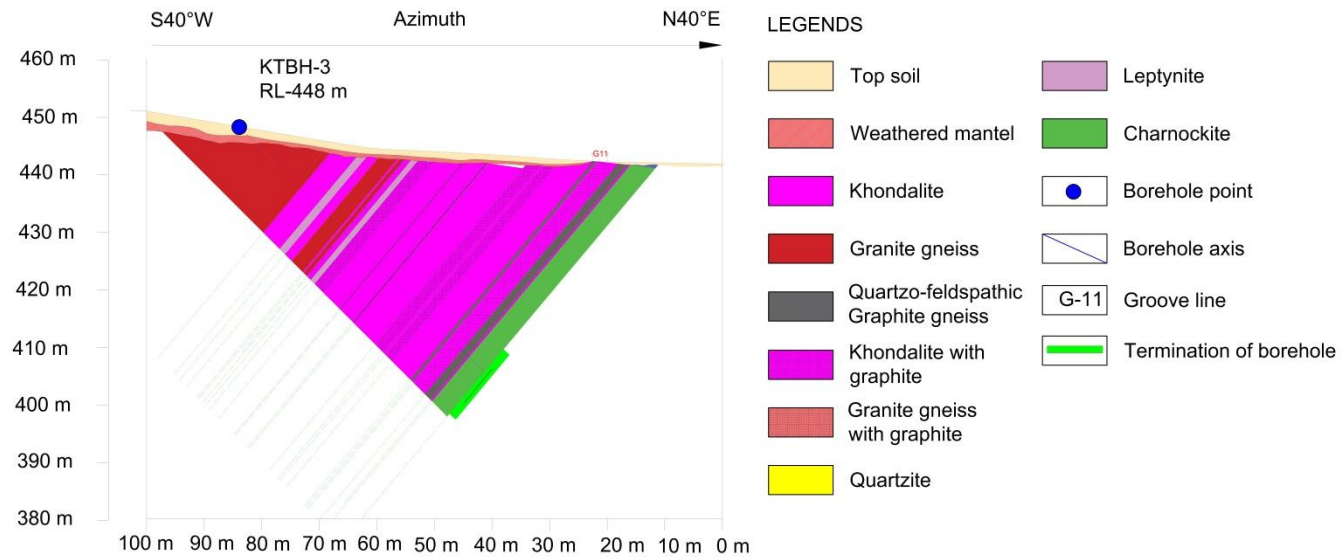


Figure 9.6: Cross sectional view of borehole KTBH-3

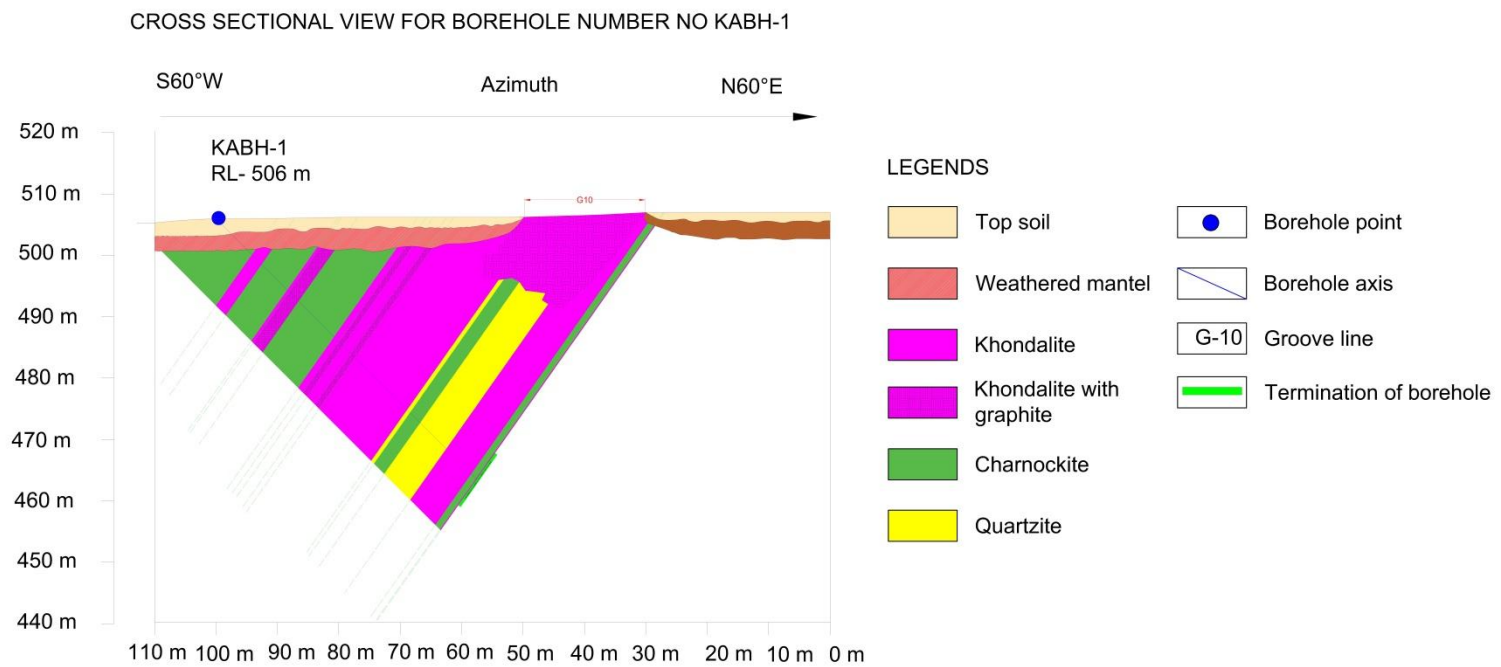


Figure 9.7: Cross sectional view of borehole KABH-1

CROSS SECTIONAL VIEW FOR BOREHOLE NUMBER NO KABH-2

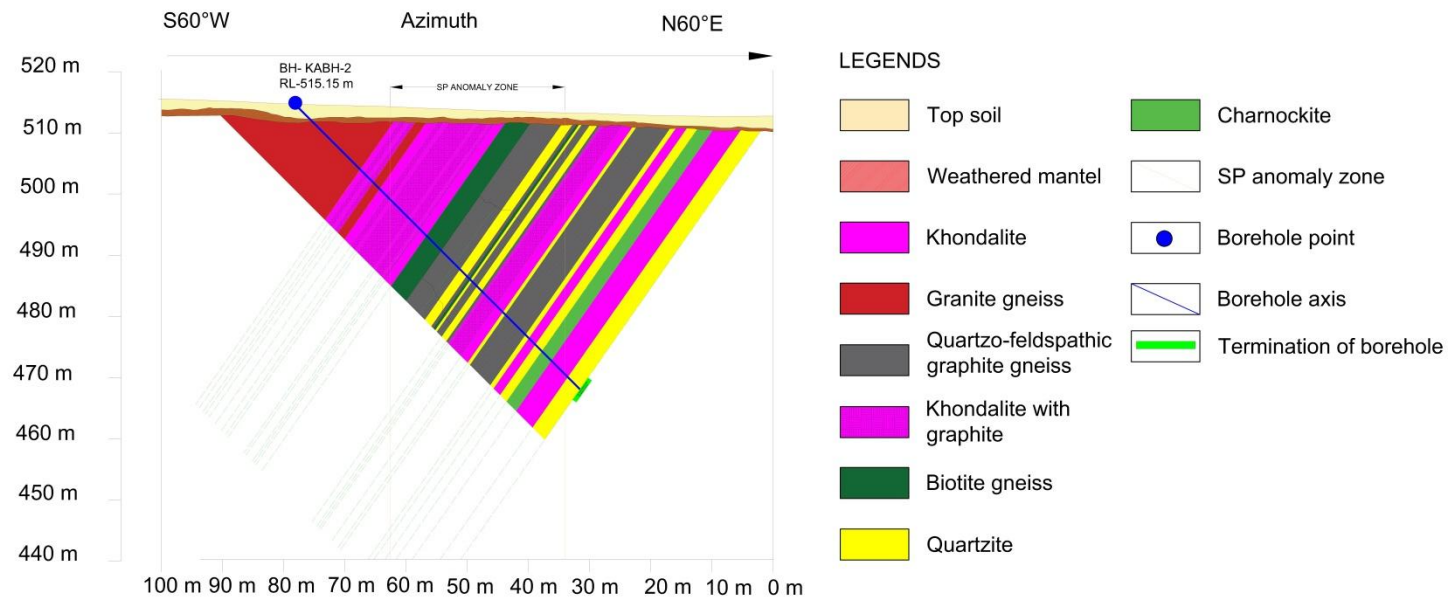


Figure 9.8: Cross sectional view of borehole KABH-2

9.3 Logging

Lithological logging is a vital component in an exploration programme which helps us to identify the thickness of the ore bands, structural features to establish large scale interpretation map, actual inclination of ore bodies etc. Precise logging & interpretation can be very useful in ore resource estimation in later stages of exploration. Proper identification of mineralized zones depth wise will be useful for better drill core sampling. Lithological logging was recorded in different columns as run number, run length, lithology, structures, description of lithology, RQD, total core recovery etc.

9.4 Mineralogy of the ore zone sampling and sample preparation

Generally four types of graphite bearing litho-units were encountered with variable mineralogy during ore zone sampling as follows:-

- 1) The graphite mineralizations in borehole cores occurs as quartzo-feldspathic graphite gneiss defining gneissosity with alternate quartz and feldspar rich layers with minor quantum of garnet.
- 2) Quartzo-feldspathic graphite gneiss found as minor bands at variable depths associated with platy minerals like biotite along with quartz and plagioclase oriented parallel to the foliation plane.
- 3) Graphite flakes are found in disseminated form in khondalites comprising medium grained garnet with alternate quartz and feldspar rich layers.
- 4) Graphite flakes were also encountered within the granite gneiss in confined planes along gneissosity.

All these types of graphite bearing litho-units were considered for mineralized zone sampling.

Drill core sampling methodology:-

- 1) Borehole datasheets are maintained simultaneously with each successive running borehole logs.
- 2) After completion of each borehole the mineralised zone is separated referring to the logging data.
- 3) Sample with 1m length interval is taken and if parting occurs in between then from both the side of the sample 1m length of country rock is considered to precisely identify the mineralised zone. Each sample of 1m is separated with the help of metallised tag with labelled metre of depth.

- 4) Detailed information like core box number, run length, depth, recovery percentage etc. are labelled on the top of the box as well inside the boxes.
- 5) Finally core boxes are winded with GI wires and preserved in camp for despatch to nearby Repository of GSI.

Sample preparation:-

Sample preparation and proximate analysis were carried out by NMCI Inspections & Survey Co. Pvt. Ltd.

9.5 Chemical analysis and laboratory procedures

The samples after submission to Chemical Lab are analysed for their fixed carbon content. Generally proximate analysis is carried out for determination of FC of graphite. The standard for chemical procedure followed for determination of FC is IS 14852:2000 of Bureau of Indian standard. The process of proximate analysis starts with the freeing of moisture content and determination of volatile matter and ash content. After determination of these 02 parameters, the sum of these two is deducted from 100. The result thus obtained is the fixed carbon value.

Determination of moisture:

About 5 g of the sample is weighed in a tarred porcelain dish and covered with a watch glass. Then the dish is placed in an air oven maintained at a temperature $150^{\circ}\text{C} \pm 10^{\circ}\text{C}$ and the watch glass is removed from it. Then the sample is heated for 02 hours in the oven and the dish is covered with the watch glass before it is taken out of the oven. Then the dish is cooled in a desiccator and weighed. The following formula is used for calculation of moisture content.

$$\text{Moisture \%} = A/B \times 100$$

Where, A= loss in weight in g of the material after heating and B= weight in g of the material taken.

Determination of volatile matter:

Nearly 1 g of the moisture free sample is introduced in a weighted volatile matter crucible with tightly fitted lid. Then the crucible is heated in a muffle furnace maintained at temperature of $925 \pm 250^{\circ}\text{C}$ for 7 minutes. The bottom of the crucible shall not rest on the floor of the muffle furnace. Then remove the crucible from the muffle furnace after 7 minutes and cool it in desiccators and weigh. The following formula is used for calculation of volatile matter content.

$$\text{Volatile matter \%} = A/B \times 100$$

Where A= loss in weight in g of the moisture free sample after heating up to $925 \pm 250^{\circ}\text{C}$
B= weight in g of the moisture free sample taken.

Determination of ash:

Nearly 1 g of the moisture free sample is taken in a silica crucible, keep the crucible in a muffle furnace and heat to $500 \pm 100^{\circ}\text{C}$ within one hour and $775 \pm 100^{\circ}\text{C}$ in two hours. A

slow stream of air is maintained through the muffle furnace. The temperature is further increased to $925 \pm 250^\circ\text{C}$ and kept for one hour. Cool it in a desiccator and weigh the sample. The procedure is repeated till the residue in the crucible is constant in weight. The following formula is used for calculation of ash content.

$$\text{Ash \%} = \frac{A}{B} \times 100$$

Where A= Weight of ash in g and B= weight in of the sample taken.

After determination of these parameters, FC is calculated with the formula

$$\text{FC \%} = 100 - (\text{VM \%} + \text{Ash \%})$$

Where, FC= Fixed carbon

VM= Volatile matter

Ash= Ash content

Proximate analysis

A total 169 numbers of core samples were analysed for proximate analysis. The analysis report is given in annexure IX.

Check samples

10% of the total core samples (16) were submitted to Shiva Analytics for check sample analysis. The analytical results are given in the annexure –X.

Analysis of minor and trace element

A total 150 numbers of core samples were analysed for minor and trace elements. Tungsten values are encouraging for maximum numbers of samples with assay value greater than 200 ppm. The analysis report is given in annexure – XI.

9.6 Details of the boreholes drilled in ore zones and their correlation

The details of the intersected mineralisation zones are given in the table 10.2.

CHAPTER-10

RESOURCE ESTIMATION

Graphite mineralisation was observed to occur in different graphite bearing zones. Geological evidences necessary for resource estimation were collected systematically by different geological and geophysical methods. After demarcation of the graphite bearing zones, 500 m drilling was carried out in eight numbers of boreholes to collect the subsurface evidences. After interpretation, it was noticed that each graphite bearing zone consist of few discrete graphite bands. But the graphite bands were showing pinch and swell nature when compared in two adjacent boreholes placed on the same graphite bearing zones. So, resource estimation was done on the principle of ore resource of any banded type mineralization. Resource of graphite was estimated separately for graphite bearing zones by cross section method considering a cut off of fixed carbon value of 2%.

10.1 Detailed description of the ore zones

The detailed descriptions of the graphite bearing zones in terms of surface evidence were given previously. In this section the description is given based on subsurface evidences. Zone wise descriptions are as follow-

Graphite Zone A

The Zone A is situated in the northern side of Kodabata village. Three boreholes KKBH-1, KKBH-2 and KKBH-3 were drilled (PLATE-III) to explore the subsurface graphite mineralization up to 30 m vertical depth of intersection. The total thickness of the graphite bearing zone A, along the boreholes encountered is 49 m.

Based on the surface and subsurface evidences, a total six number of graphite bands (PLATE-IV) were interpreted for the graphite zone A. The maximum and minimum thicknesses of the bands intersected were 4.71 m and 0.68 m. The average FC% for the bands varies from 2.24% to 5.98%. The sectional view of the graphite bands of average FC% greater than 2% are shown in PLATE-VI.

Graphite Zone-B

The graphite zone (Plate-II) is located within a hillock near the southwestern part of Tala Barangapadar village. Three boreholes KTBH-1, KTBH-2 and KTBH-3 were drilled (PLATE-III) to understand the subsurface geological evidences of the graphite mineralization up to 30 m vertical depth of intersection. The total true thickness of the graphite bearing zone B based on the borehole evidence is 34.68 m.

Two number of graphite bands (PLATE-IV) were interpreted based on the surface and subsurface geological evidences where the average true thickness of the bands are 1.55 m & 2.42 m and the average fixed carbon are 5.5% & 6.4% respectively. The sectional view of the graphite bands of average FC% greater than 2% are shown in PLATE-VI.

10.2 Cut-off grade

The F.C values for graphite samples collected from the surface outcrop ranges from 0.11% to 10.65%. As cut off 2% F.C was considered for resource estimation of graphite.

10.3 Bulk density calculation

As per the quantum of work sanctioned, bulk density studies (Table 10.1) was carried out by Shiva analyticals India Limited for 5 numbers of samples. Additionally, the bulk density studies were carried out for the other samples at the project site (Annexure XIII).

| Table number 10.1. Bulk density result | | |
|--|------------------|------------------------------------|
| Sl. No | Sample number | Bulk density (gm/cm ³) |
| 1 | KKBH-3/S-4/M-9 | 2.36 |
| 2 | KABH-2/S-12/M-10 | 2.54 |
| 3 | KTBH-1/S-8/M-11 | 2.76 |
| 4 | KKBH-2/S-26/M-12 | 2.63 |
| 5 | KKBH-1/S-23/M-13 | 2.46 |

10.4 Assumption of resource estimation

The following factors were assumed for resource estimation –

- The cut-off was considered as 2% for resource estimation of graphite.
- Band wise average bulk density was estimated. Unit for bulk density was tonne/m³.
- True thicknesses of the graphite bearing bands were calculated trigonometrically.
- The volume was calculated by $V = \text{Strike influence} \times \text{dip influence} \times \text{true thickness}$.
- Strike influence of 50% of borehole interval between two successive boreholes was considered for the side having geological confidence and 25% was taken for the side of less geological confidence.
- Average weighted grade for graphite bearing band was calculated using the formula $\sum(l_1 \times A_1 + l_2 \times A_2 \dots \dots) \div (\sum(l_1 + l_2 \dots \dots))$ where, l_1 = sample length and A_1 = Fixed carbon percentage.
- Resource of graphite was calculated by using the formula

$$T_g = V_g \times \rho_g$$

Where, T_g = Resource of graphite, V_g = Volume of graphite band, ρ_g = average bulk density of graphite band.

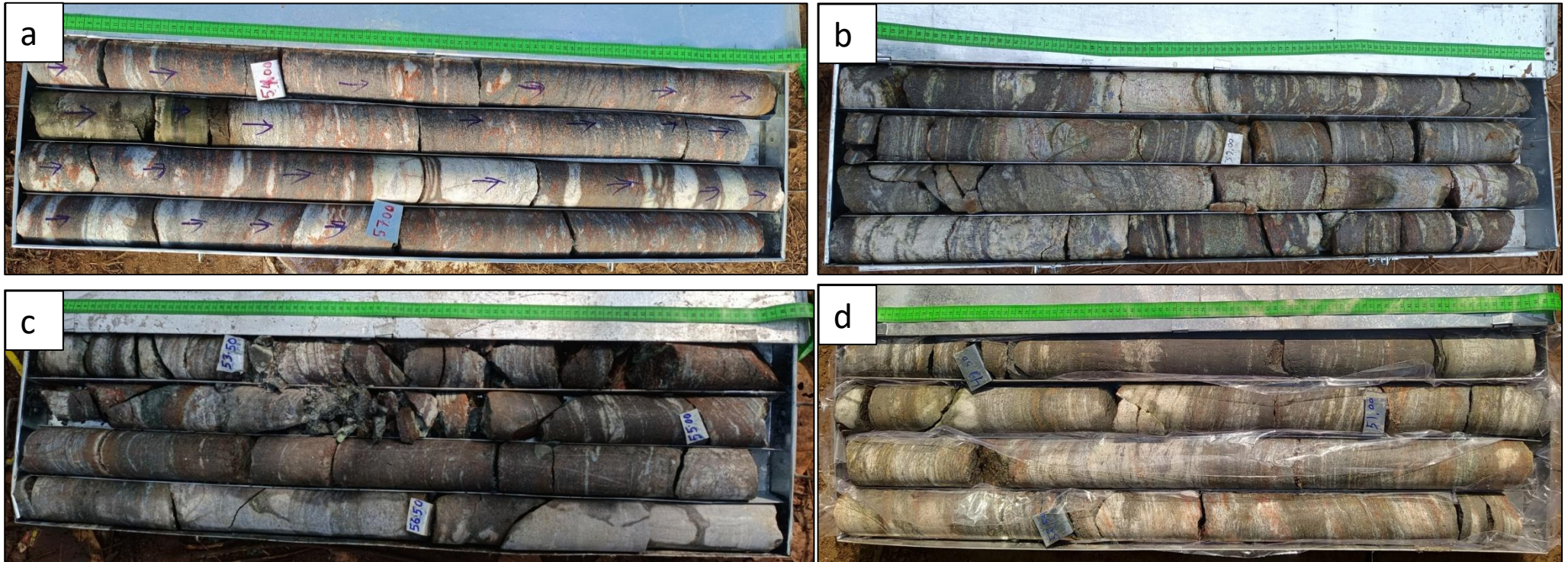


Fig.10.1. Photographs of borehole cores: (a) quartzite-feldspathic graphite gneiss from KKBH-1, (b) Quartzite-feldspathic graphite gneiss from KKBH-2, (c) Quartzite-feldspathic graphite gneiss from KTBH-3, (d) Quartzite-feldspathic graphite gneiss from KABH-2

10.5 Resource estimation by cross sectional area method

10.5.1. Resource for Graphite at 2% Cut off

The resource for graphite was estimated by cross sectional method based on the assumptions described in section 10.4. The table 10.2 is representing the zone wise estimated resource in million tonne. Cumulative resource for graphite at 2% cut off of zone A and zone B are 0.123 million tonne and 0.056 million tonne respectively.

| Table 10.2 Resource for graphite at 2% FC cut off by cross sectional area method | | | | | | | | | | |
|--|----------------|--------------|-------------------|----------------------|--|--------------------|---|--|----------------------|---|
| Borehole Number | Depth From (m) | Depth To (m) | Band for Graphite | Strike Influence (m) | Average Dip Influence for Graphite (m) | True Thickness (m) | Band wise volume for graphite (m ³) | Average bulk density (Tonne/m ³) | Average weighted FC% | Band wise resource at 2% cut off (in million tonne) |
| Grooveline G-6 | | | B-6 | 50 | 19 | 5.27 | 5006.50 | 2.36 | 5.67 | 0.012 |
| KKBH-1 | 15.17 | 18.08 | B-3 | 105 | 8.58 | 2.43 | 780.31 | 2.06 | 4.44 | 0.005 |
| | 20.55 | 21.5 | B-4 | 52 | 7.6 | 0.82 | 325.36 | 2.57 | 4.45 | 0.001 |
| | 48.91 | 49.69 | B-5 | 52 | 17.57 | 0.68 | 617.57 | 2.55 | 2.24 | 0.002 |
| | 51.7 | 57.14 | B-6 | 52 | 19.41 | 4.71 | 4759.44 | 2.36 | 2.94 | 0.011 |
| Grooveline G-7 | | | B-3 | 65 | 14 | 3.54 | 3221.40 | 2.45 | 10.21 | 0.008 |
| KKBH-2 | 5.45 | 7.55 | B-1 | 42 | 3.69 | 1.82 | 282.40 | 2.61 | 2.94 | 0.001 |
| | 10.95 | 11.92 | B-2 | 42 | 6.32 | 0.84 | 223.13 | 2.41 | 4.42 | 0.001 |
| | 35.36 | 41.42 | B-3 | 65 | 20.67 | 5.25 | 7056.59 | 2.41 | 3.46 | 0.017 |
| G-12 | | | B-3 | 93 | 27 | 5.85 | 14689.35 | 2.38 | 4.66 | 0.035 |
| KKBH-3 | 47.8 | 53.93 | B-3 | 93 | 27.11 | 5.31 | 13392.22 | 2.38 | 4.6 | 0.032 |
| Cumulative resource of graphite for zone A at 2% cut off | | | | | | | | | | 0.123 |
| Grooveline G-3 | | | B-7 | 53 | 33 | 2 | 3498.00 | 2.67 | 9.99 | 0.009 |
| KTBH-1 | 60 | 62.8 | B-7 | 53 | 32.85 | 2.14 | 3733.67 | 2.67 | 6.1 | 0.010 |

| | | | | | | | | | | |
|---|--------------|--------------|------------|-----------|--------------|-------------|----------------|-------------|-------------|--------------|
| KTBH-2 | 39.5 | 40.5 | B-7 | 53 | 21.48 | 0.77 | 876.54 | 2.94 | 4.3 | 0.003 |
| | 63.6 | 65.63 | B-8 | 35 | 34.53 | 1.55 | 1879.41 | 2.56 | 5.51 | 0.005 |
| Grooveline G-11 | | | B-7 | 53 | 29 | 3.8 | 5840.60 | 2.62 | 8.27 | 0.015 |
| KTBH-3 | 52.16 | 56.6 | B-7 | 53 | 29.12 | 3.40 | 5249.13 | 2.62 | 3.57 | 0.014 |
| Cumulative resource of graphite for zone B at 2% cut off | | | | | | | | | | 0.056 |
| Cumulative resource of graphite for zone A & B at 2% cut off | | | | | | | | | | 0.176 |

10.6. Resource estimation by SURPAC modeling

Resource estimation by SURPAC modeling for graphite at 2% FC and tungsten (W) at 500 ppm is as follow-

| Table 10.4 Resource estimation sheet (graphite) for zone A | | | | | |
|---|-------------|--------------------------------|-------------------------------|---------------|--|
| Zone | Band | Volume (in Cubic meter) | Bulk Density (average) | Tonnes | Resource in MT |
| A | B1 | 322 | 2.61 | 840.42 | 0.00084 |
| | B2 | 178 | 2.41 | 428.98 | 0.000429 |
| | B3 | 39510 | 2.41 | 95219.1 | 0.095219 |
| | B4 | 368 | 2.57 | 945.76 | 0.000946 |
| | B5 | 554 | 2.36 | 1307.44 | 0.001307 |
| | B6 | 10298 | 2.36 | 24303.28 | 0.024303 |
| Total resource of graphite ore body (FC\geq 2%) | | 51230 | | | 0.123045\approx0.123 |

| Table 10.5 Resource estimation sheet (graphite) for zone B | | | | | |
|---|-------------|--------------------------------|-------------------------------|---------------|--|
| Zone | Band | Volume (in Cubic meter) | Bulk Density (average) | Tonnes | Resource in MT |
| B | B7 | 23460 | 2.64 | 61934.4 | 0.061934 |
| | B8 | 1960 | 2.56 | 5017.6 | 0.005018 |
| Total resource of graphite ore body (FC\geq 2%) | | 25420 | | | 0.066952\approx0.067 |

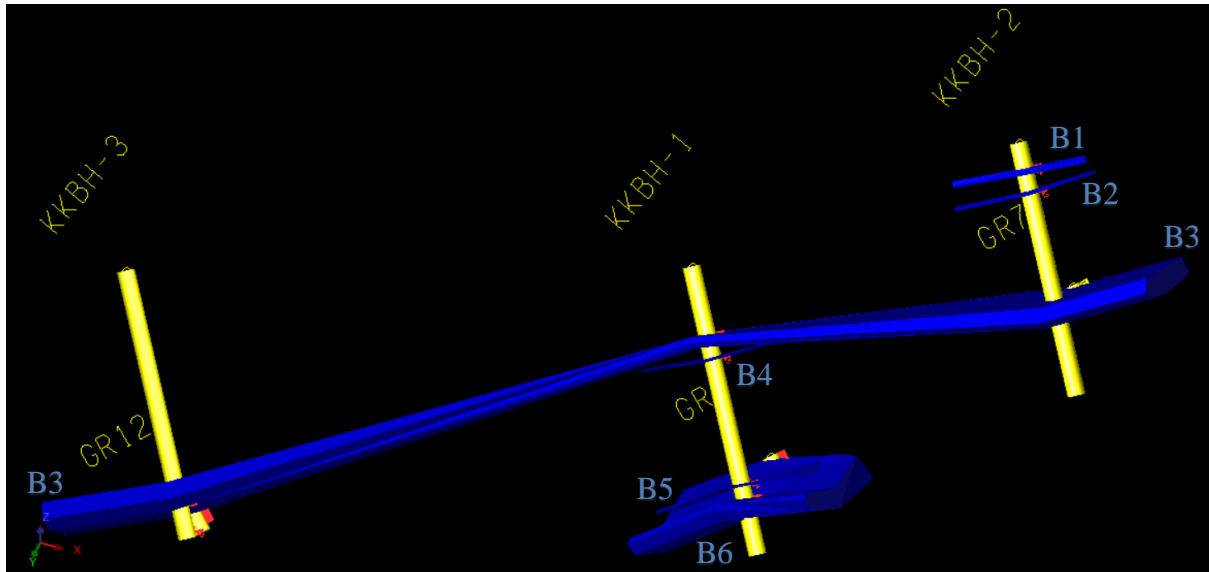


Figure 10.2: Solid model for graphite mineralization for Zone A

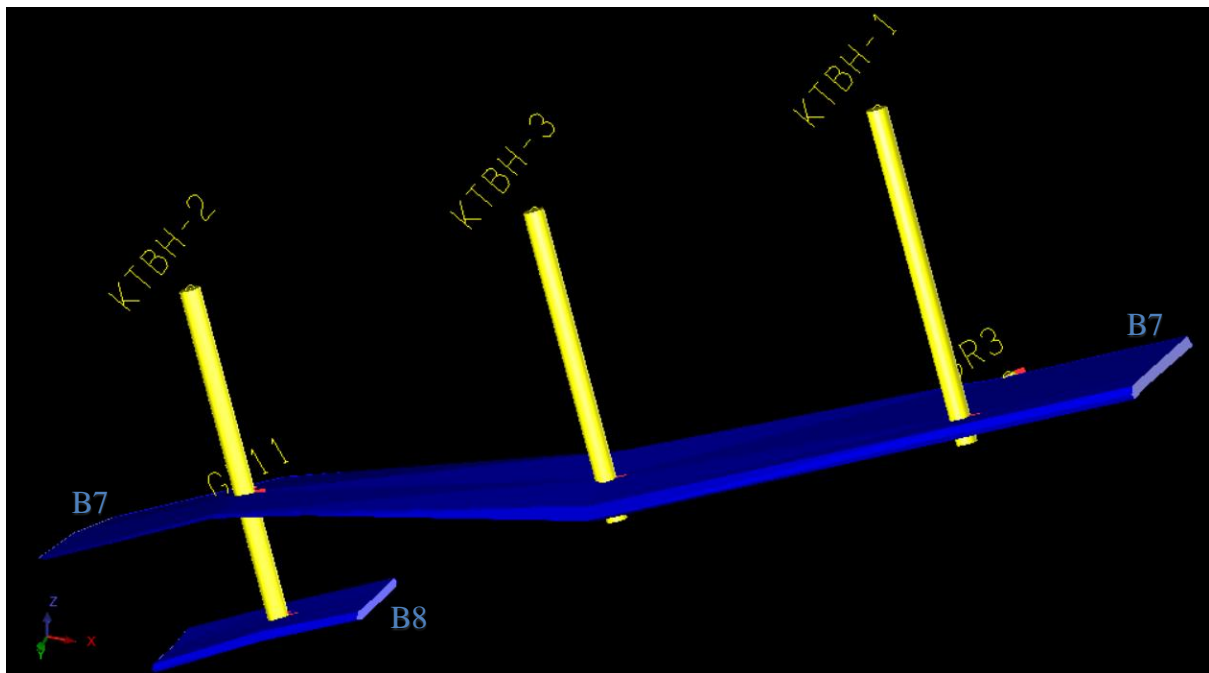


Figure 10.3: solid model for graphite mineralization for zone B

CHAPTER 11.

CONCLUSION AND RECOMMENDATION

- The graphite occurrences in the block occur as elongated lensoidal bands and hosted by quartzo-feldspathic gneiss.
- Potential graphite mineralizations of the area are restricted only in the southern part of the area.
- The zone-A area can be upgraded into G-3 to investigate the resource of both graphite ore.
- As the repeat analyses of samples for W do not give encouraging results, the resource estimation for tungsten is avoided.

CHAPTER 12.

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| Annexure I: Analysis report of 100 graphite bearing bed rock samples | | | | | | | | | | | | | |
|--|-----------------|--|------|--------------|------|------|------------|------------------------------|--------------|--------|---------|-------|--------|
| SL NO | LAB SAMPLE CODE | LOCATION | BAND | SAMPLE ID | FROM | TO | LENGTH (m) | LITHOLOGY | MOISTURE (%) | VM (%) | ASH (%) | S (%) | FC (%) |
| 1 | FST - 812 | Along 220° from location G-1 (44Q 776175 E 2140027 N) | B1 | KN/Z-1/G-1/1 | 0 | 2.3 | 2.3 | Granite gneiss with graphite | 0.33 | 1.40 | 98.43 | 0.11 | 0.06 |
| 2 | FST - 813 | | | KN/Z-1/G-1/2 | 17.4 | 20 | 2.6 | Granite gneiss with graphite | 0.32 | 1.74 | 98.05 | 0.10 | 0.11 |
| 3 | FST - 814 | | | KN/Z-1/G-1/3 | 40 | 41.9 | 1.9 | Granite gneiss with graphite | 0.42 | 1.39 | 98.43 | 0.13 | 0.05 |
| 4 | FST - 815 | | | KN/Z-1/G-1/4 | 54 | 56.1 | 2.1 | Granite gneiss with graphite | 0.45 | 1.29 | 98.59 | 0.11 | 0.01 |
| 5 | FST - 816 | | | KN/Z-1/G-1/5 | 69 | 71.8 | 2.8 | Granite gneiss with graphite | 0.72 | 1.56 | 98.25 | 0.12 | 0.07 |
| 6 | FST - 817 | Along 220° from location R-672 (44Q 775417 E 2140921 N) | B1 | KN/Z-1/G-2/1 | 17 | 19.6 | 2.6 | Granite gneiss with graphite | 0.28 | 1.10 | 98.67 | 0.14 | 0.09 |
| 7 | FST - 818 | | | KN/Z-1/G-2/2 | 43.6 | 45.7 | 2.1 | Granite gneiss with graphite | 0.38 | 1.40 | 98.44 | 0.09 | 0.07 |
| 8 | FST - 819 | | | KN/Z-1/G-2/3 | 61.3 | 63.3 | 2 | Granite gneiss with graphite | 0.21 | 0.75 | 99.08 | 0.08 | 0.09 |
| 9 | FST - 820 | | | KN/Z-1/G-2/4 | 63.3 | 65.4 | 2.1 | Granite gneiss with graphite | 0.20 | 0.42 | 99.28 | 0.07 | 0.23 |
| 10 | FST - 821 | | | KN/Z-1/G-2/5 | 85.1 | 86.1 | 1 | Granite gneiss with graphite | 0.57 | 2.16 | 97.58 | 0.14 | 0.12 |
| 11 | FST - 822 | Along 220° from location ABRT-769 (44Q 774530 E 2140414 N) | B1 | KN/Z-2/G-3/1 | 0 | 1.1 | 1.1 | Granite gneiss with graphite | 0.11 | 0.81 | 89.73 | 0.19 | 9.27 |
| 12 | FST - 823 | | | KN/Z-2/G-3/2 | 5.3 | 6.6 | 1.3 | Granite gneiss with graphite | 0.24 | 0.95 | 88.24 | 0.21 | 10.60 |
| 13 | FST - 824 | | | KN/Z-2/G-3/3 | 24.6 | 25.9 | 1.3 | Granite gneiss with graphite | 0.31 | 1.07 | 98.69 | 0.12 | 0.12 |
| 14 | FST - 825 | | | KN/Z-2/G-3/4 | 54.7 | 56 | 1.3 | Granite gneiss with graphite | 0.18 | 0.53 | 99.33 | 0.11 | 0.03 |
| 15 | FST - 826 | | | KN/Z-2/G-3/5 | 62 | 63.6 | 1.6 | Granite gneiss with graphite | 0.11 | 0.65 | 99.19 | 0.09 | 0.07 |
| 16 | FST - 837 | Along 220° from location (44Q 774297 E 2140408 N) | B1 | KN/Z-2/G-4/1 | 0 | 1 | 1 | Granite gneiss with graphite | 0.40 | 1.66 | 98.04 | 0.15 | 0.15 |
| 17 | FST - 838 | | | KN/Z-2/G-4/2 | 17.6 | 19.9 | 2.3 | Granite gneiss with graphite | 0.62 | 2.74 | 97.01 | 0.14 | 0.11 |
| 18 | FST - 839 | | | KN/Z-2/G-4/3 | 47.9 | 49.9 | 2 | Granite gneiss with | 0.35 | 1.35 | 98.43 | 0.06 | 0.16 |

| Annexure I: Analysis report of 100 graphite bearing bed rock samples | | | | | | | | | | | | | |
|--|-----------------|---|------|--------------|------|------|------------|-------------------------------------|--------------|--------|---------|-------|--------|
| SL NO | LAB SAMPLE CODE | LOCATION | BAND | SAMPLE ID | FROM | TO | LENGTH (m) | LITHOLOGY | MOISTURE (%) | VM (%) | ASH (%) | S (%) | FC (%) |
| | | | | | | | | graphite | | | | | |
| 19 | FST - 840 | | | KN/Z-2/G-4/4 | 49.9 | 52.9 | 3 | Granite gneiss with graphite | 0.35 | 1.20 | 98.61 | 0.14 | 0.05 |
| 20 | FST - 841 | | | KN/Z-2/G-4/5 | 52.9 | 55.9 | 3 | Granite gneiss with graphite | 0.35 | 1.19 | 98.43 | 0.12 | 0.26 |
| 21 | FST - 842 | Along 210° from location (44Q 774692 E 2138445 N) | B1 | KN/Z-3/G-5/1 | 0 | 2.5 | 2.5 | Granite gneiss with graphite | 0.64 | 1.89 | 97.67 | 0.17 | 0.27 |
| 22 | FST - 843 | | | KN/Z-3/G-5/2 | 2.5 | 3.9 | 1.4 | Granite gneiss with graphite | 0.36 | 1.20 | 98.36 | 0.12 | 0.32 |
| 23 | FST - 844 | | | KN/Z-3/G-5/3 | 9.2 | 12 | 2.8 | Granite gneiss with graphite | 0.36 | 1.09 | 98.40 | 0.11 | 0.40 |
| 24 | FST - 845 | | | KN/Z-3/G-5/4 | 15.2 | 17.6 | 2.4 | Granite gneiss with graphite | 0.24 | 1.63 | 98.00 | 0.15 | 0.22 |
| 25 | FST - 846 | | | KN/Z-3/G-5/5 | 17.6 | 19.6 | 2 | Granite gneiss with graphite | 0.53 | 1.52 | 98.14 | 0.17 | 0.17 |
| 26 | FST - 847 | | | KN/Z-3/G-5/6 | 27.5 | 29.6 | 2.1 | Granite gneiss with graphite | 0.44 | 1.78 | 97.92 | 0.16 | 0.14 |
| 27 | FST - 848 | | | KN/Z-3/G-5/7 | 49 | 52 | 3 | Granite gneiss with graphite | 0.55 | 1.46 | 98.29 | 0.14 | 0.11 |
| 28 | FST - 943 | Along 220° from location (44Q 773652 E 2141476N) | B-1 | KN/Z-4/G-6/1 | 0 | 1 | 1 | Quartzo-feldspathic graphite gneiss | 0.84 | 1.45 | 91.68 | 0.09 | 6.78 |
| 29 | FST - 944 | | | KN/Z-4/G-6/2 | 17.2 | 18.2 | 1 | Quartzo-feldspathic graphite gneiss | 0.40 | 2.07 | 92.70 | 0.07 | 5.16 |
| 30 | FST - 945 | | | KN/Z-4/G-6/3 | 18.2 | 19.2 | 1 | Quartzo-feldspathic graphite gneiss | 0.43 | 1.72 | 93.03 | 0.09 | 5.16 |
| 31 | FST - 946 | | | KN/Z-4/G-6/4 | 19.2 | 20.2 | 1 | Quartzo-feldspathic graphite gneiss | 0.48 | 1.71 | 92.11 | 0.11 | 6.07 |
| 32 | FST - 947 | | | KN/Z-4/G-6/5 | 20.2 | 21.2 | 1 | Quartzo-feldspathic graphite gneiss | 0.42 | 1.93 | 92.39 | 0.13 | 5.55 |
| 33 | FST - 948 | | | KN/Z-4/G-6/6 | 21.2 | 22.2 | 1 | Quartzo-feldspathic graphite gneiss | 0.36 | 2.04 | 92.35 | 0.15 | 5.46 |
| 34 | FST - 949 | | | KN/Z-4/G-6/7 | 22.2 | 23 | 0.8 | Quartzo-feldspathic graphite gneiss | 0.49 | 1.71 | 92.62 | 0.17 | 5.50 |
| 35 | FST - 953 | Along 220° from location (44Q 773683E) | | KN/Z-4/G-7/1 | 0 | 1 | 1 | Quartzo-feldspathic graphite gneiss | 0.94 | 1.46 | 88.28 | 0.16 | 10.10 |
| 36 | FST - 954 | | | KN/Z-4/G-7/2 | 1 | 2 | 1 | Quartzo-feldspathic | 0.64 | 1.31 | 88.83 | 0.13 | 9.73 |

| Annexure I: Analysis report of 100 graphite bearing bed rock samples | | | | | | | | | | | | | |
|--|-----------------|---|------|---------------|------|-----|------------|-------------------------------------|--------------|--------|---------|-------|--------|
| SL NO | LAB SAMPLE CODE | LOCATION | BAND | SAMPLE ID | FROM | TO | LENGTH (m) | LITHOLOGY | MOISTURE (%) | VM (%) | ASH (%) | S (%) | FC (%) |
| | | 2141381 N) | | | | | | graphite gneiss | | | | | |
| 37 | FST - 955 | | | KN/Z-4/G-7/3 | 2 | 3 | 1 | Quartzo-feldspathic graphite gneiss | 0.59 | 1.76 | 87.46 | 0.14 | 10.64 |
| 38 | FST - 956 | | | KN/Z-4/G-7/4 | 3 | 4 | 1 | Quartzo-feldspathic graphite gneiss | 0.83 | 1.80 | 87.67 | 0.16 | 10.37 |
| 39 | FST - 957 | | | KN/Z-5/G-8/1 | 0 | 1 | 1 | Granite gneiss with graphite | 0.60 | 1.91 | 97.85 | 0.18 | 0.06 |
| 40 | FST - 958 | | | KN/Z-5/G-8/2 | 1 | 2 | 1 | Granite gneiss with graphite | 0.58 | 1.85 | 97.80 | 0.17 | 0.18 |
| 41 | FST - 959 | | | KN/Z-5/G-8/3 | 11 | 12 | 1 | Granite gneiss with graphite | 0.27 | 2.04 | 97.65 | 0.12 | 0.19 |
| 42 | FST - 960 | | | KN/Z-5/G-8/4 | 12 | 13 | 1 | Granite gneiss with graphite | 0.28 | 1.96 | 97.36 | 0.17 | 0.51 |
| 43 | FST - 961 | | | KN/Z-5/G-8/5 | 13 | 14 | 1 | Granite gneiss with graphite | 0.29 | 2.01 | 97.39 | 0.13 | 0.47 |
| 44 | FST - 962 | Along 220° from location (44Q 772858 E 2141667N) | B-1 | KN/Z-5/G-8/6 | 14 | 15 | 1 | Granite gneiss with graphite | 0.20 | 1.47 | 97.50 | 0.14 | 0.89 |
| 45 | FST - 963 | | | KN/Z-5/G-8/7 | 15 | 16 | 1 | Granite gneiss with graphite | 0.18 | 1.83 | 97.57 | 0.11 | 0.49 |
| 46 | FST - 964 | | | KN/Z-5/G-8/8 | 16 | 17 | 1 | Granite gneiss with graphite | 0.44 | 2.25 | 97.27 | 0.14 | 0.34 |
| 47 | FST - 965 | | | KN/Z-5/G-8/9 | 17 | 18 | 1 | Granite gneiss with graphite | 0.40 | 2.00 | 97.50 | 0.14 | 0.36 |
| 48 | FST - 966 | | | KN/Z-5/G-8/10 | 18 | 19 | 1 | Granite gneiss with graphite | 0.39 | 2.19 | 97.21 | 0.15 | 0.45 |
| 49 | FST - 967 | | | KN/Z-5/G-8/11 | 19 | 20 | 1 | Granite gneiss with graphite | 0.26 | 1.73 | 97.68 | 0.18 | 0.41 |
| 50 | FST - 968 | | | KN/Z-5/G-8/12 | 20 | 21 | 1 | Granite gneiss with graphite | 0.26 | 1.46 | 97.84 | 0.14 | 0.56 |
| 51 | FST - 969 | | | KN/Z-6/G-9/1 | 0 | 1 | 1 | Granite gneiss with graphite | 0.45 | 2.12 | 97.29 | 0.18 | 0.41 |
| 52 | FST - 970 | Along 205° from location (44Q 776199 E 2137596 N) | B-1 | KN/Z-6/G-9/2 | 1.5 | 2.5 | 1 | Granite gneiss with graphite | 0.42 | 1.57 | 97.82 | 0.17 | 0.44 |
| 53 | FST - 971 | | | KN/Z-6/G-9/3 | 2.5 | 3.5 | 1 | Granite gneiss with graphite | 0.26 | 1.89 | 97.66 | 0.17 | 0.28 |
| 54 | FST - 972 | | | KN/Z-6/G-9/4 | 3.5 | 4.5 | 1 | Granite gneiss with | 0.27 | 1.28 | 98.28 | 0.16 | 0.28 |

| Annexure I: Analysis report of 100 graphite bearing bed rock samples | | | | | | | | | | | | | |
|--|-----------------|---|------|----------------|------|------|------------|------------------------------|--------------|--------|---------|-------|--------|
| SL NO | LAB SAMPLE CODE | LOCATION | BAND | SAMPLE ID | FROM | TO | LENGTH (m) | LITHOLOGY | MOISTURE (%) | VM (%) | ASH (%) | S (%) | FC (%) |
| | | | | | | | | graphite | | | | | |
| 55 | FST - 973 | | | KN/Z-6/G-9/5 | 4.5 | 5.5 | 1 | Granite gneiss with graphite | 0.27 | 1.29 | 98.02 | 0.15 | 0.54 |
| 56 | FST - 974 | | | KN/Z-6/G-9/6 | 5.5 | 6.5 | 1 | Granite gneiss with graphite | 0.29 | 1.46 | 97.99 | 0.17 | 0.38 |
| 57 | FST - 975 | | | KN/Z-6/G-9/7 | 56.5 | 57.5 | 1 | Granite gneiss with graphite | 0.37 | 1.73 | 97.48 | 0.14 | 0.65 |
| 58 | FST - 976 | | | KN/Z-6/G-9/8 | 57.5 | 58.5 | 1 | Granite gneiss with graphite | 0.26 | 1.03 | 98.23 | 0.17 | 0.57 |
| 59 | FST - 977 | | | KN/Z-6/G-9/9 | 58.5 | 60 | 1.5 | Granite gneiss with graphite | 0.22 | 1.15 | 97.86 | 0.16 | 0.83 |
| 60 | FST - 978 | Along 240° from location (44Q 776107 E 2139649 N) | B-1 | KN/Z-7/G-10/1 | 0 | 1 | 1 | Granite gneiss with graphite | 2.17 | 5.23 | 92.95 | 0.14 | 1.68 |
| 61 | FST - 979 | | | KN/Z-7/G-10/2 | 1.5 | 2.5 | 1 | Granite gneiss with graphite | 2.20 | 4.35 | 95.01 | 0.14 | 0.50 |
| 62 | FST - 980 | | | KN/Z-7/G-10/3 | 2.5 | 3.5 | 1 | Granite gneiss with graphite | 2.13 | 5.22 | 92.45 | 0.16 | 2.17 |
| 63 | FST - 981 | | | KN/Z-7/G-10/4 | 3.5 | 4.5 | 1 | Granite gneiss with graphite | 2.30 | 5.16 | 90.62 | 0.15 | 4.07 |
| 64 | FST - 982 | | | KN/Z-7/G-10/5 | 5.8 | 6.8 | 1 | Granite gneiss with graphite | 2.14 | 4.52 | 94.37 | 0.18 | 0.93 |
| 65 | FST - 983 | | | KN/Z-7/G-10/6 | 6.8 | 7.8 | 1 | Granite gneiss with graphite | 0.85 | 4.45 | 93.02 | 0.17 | 2.36 |
| 66 | FST - 984 | | | KN/Z-7/G-10/7 | 7.8 | 8.8 | 1 | Granite gneiss with graphite | 1.36 | 5.23 | 91.60 | 0.15 | 3.02 |
| 67 | FST - 985 | | | KN/Z-7/G-10/8 | 8.8 | 9.8 | 1 | Granite gneiss with graphite | 1.17 | 5.02 | 92.33 | 0.14 | 2.51 |
| 68 | FST - 986 | | | KN/Z-7/G-10/9 | 11 | 12 | 1 | Granite gneiss with graphite | 1.21 | 5.04 | 92.50 | 0.14 | 2.32 |
| 69 | FST - 987 | | | KN/Z-7/G-10/10 | 12 | 13 | 1 | Granite gneiss with graphite | 1.39 | 5.11 | 92.25 | 0.18 | 2.46 |
| 70 | FST - 988 | | | KN/Z-7/G-10/11 | 20 | 21 | 1 | Granite gneiss with graphite | 1.51 | 5.00 | 92.39 | 0.19 | 2.42 |
| 71 | FST - 989 | | | KN/Z-7/G-10/12 | 21 | 22 | 1 | Granite gneiss with graphite | 1.37 | 5.12 | 92.61 | 0.17 | 2.10 |
| 72 | FST - 990 | | | KN/Z-7/G- | 22 | 23 | 1 | Granite gneiss with | 1.50 | 5.21 | 92.31 | 0.16 | 2.32 |

| Annexure I: Analysis report of 100 graphite bearing bed rock samples | | | | | | | | | | | | | |
|--|---------------------|---|------|----------------|-------|-------|------------|-------------------------------------|--------------|--------|---------|-------|--------|
| SL NO | LAB SAMPLE CODE | LOCATION | BAND | SAMPLE ID | FROM | TO | LENGTH (m) | LITHOLOGY | MOISTURE (%) | VM (%) | ASH (%) | S (%) | FC (%) |
| | | | | 10/13 | | | | graphite | | | | | |
| 73 | FST - 991 | | | KN/Z-7/G-10/14 | 23 | 24 | 1 | Granite gneiss with graphite | 2.79 | 4.69 | 94.84 | 0.15 | 0.32 |
| 74 | FST - 992 | | | KN/Z-7/G-10/15 | 25.4 | 26.4 | 1 | Granite gneiss with graphite | 2.03 | 4.63 | 93.18 | 0.14 | 2.05 |
| 75 | FST - 993 | | | KN/Z-7/G-10/16 | 29 | 30 | 1 | Granite gneiss with graphite | 2.89 | 4.80 | 93.85 | 0.15 | 1.20 |
| 76 | NMCI/FST/24-25/1091 | Along 310° from location (44Q 773652 E 2141452 N) | B-1 | KN/Z-4/G-12/1 | 0 | 1 | 1 | Quartzo-feldspathic graphite gneiss | 0.9 | 2.23 | 92.87 | 0.14 | 4.76 |
| 77 | NMCI/FST/24-25/1092 | | | KN/Z-4/G-12/2 | 1 | 2 | 1 | Quartzo-feldspathic graphite gneiss | 0.72 | 2.36 | 93.6 | 0.15 | 3.89 |
| 78 | NMCI/FST/24-25/1093 | | | KN/Z-4/G-12/3 | 2 | 3 | 1 | Quartzo-feldspathic graphite gneiss | 0.55 | 2.57 | 91.91 | 0.18 | 5.34 |
| 79 | NMCI/FST/24-25/1094 | | | KN/Z-4/G-12/4 | 3 | 4 | 1 | Quartzo-feldspathic graphite gneiss | 0.89 | 2.61 | 92.76 | 0.14 | 4.49 |
| 80 | NMCI/FST/24-25/1095 | | | KN/Z-4/G-12/5 | 4 | 5 | 1 | Quartzo-feldspathic graphite gneiss | 0.67 | 1.98 | 93.54 | 0.18 | 4.3 |
| 81 | NMCI/FST/24-25/1096 | | | KN/Z-4/G-12/6 | 5 | 5.85 | 0.85 | Quartzo-feldspathic graphite gneiss | 0.85 | 2.17 | 92.45 | 0.17 | 5.21 |
| 82 | NMCI/FST/24-25/1097 | | | KN/Z-4/G-12/7 | 37.85 | 38.85 | 1 | Quartzo-feldspathic graphite gneiss | 2.15 | 5.51 | 91.28 | 0.17 | 3.04 |
| 83 | NMCI/FST/24-25/1098 | | | KN/Z-4/G-12/8 | 38.85 | 39.85 | 1 | Quartzo-feldspathic graphite gneiss | 2.22 | 5.49 | 92.08 | 0.16 | 2.27 |
| 84 | NMCI/FST/24-25/1099 | Along 310° from location (44Q 773695 E 2141349 N) | B-1 | KN/Z-4/G-13/1 | 0 | 1.2 | 1.2 | Quartzo-feldspathic graphite gneiss | 1.15 | 1.46 | 91.15 | 0.15 | 7.24 |
| 85 | NMCI/FST/24-25/1100 | | | KN/Z-4/G-13/2 | 6.12 | 7.04 | 0.92 | Quartzo-feldspathic graphite gneiss | 0.84 | 2 | 92.6 | 0.17 | 5.23 |
| 86 | NMCI/FST/24-25/1101 | | | KN/Z-4/G-13/3 | 16.4 | 17.4 | 1 | Quartzo-feldspathic graphite gneiss | 0.97 | 2.06 | 90.86 | 0.14 | 6.94 |
| 87 | NMCI/FST/24-25/1102 | | | KN/Z-4/G-13/4 | 17.4 | 18.15 | 0.75 | Quartzo-feldspathic graphite gneiss | 1.17 | 2.41 | 89.61 | 0.17 | 7.81 |
| 88 | NMCI/FST/24-25/1103 | Along 330° from location (44Q 776097 E 2139643 N) | B-1 | KN/Z-7/G-14/1 | 0 | 1 | 1 | Granite gneiss with graphite | 1.23 | 4.52 | 91.29 | 0.16 | 4.03 |
| 89 | NMCI/FST/24-25/1104 | | | KN/Z-7/G-14/2 | 1 | 2 | 1 | Granite gneiss with graphite | 1.56 | 5.68 | 92.01 | 0.14 | 2.17 |
| 90 | NMCI/FST/24-25/1105 | | | KN/Z-7/G-14/3 | 2 | 3 | 1 | Granite gneiss with | 1.71 | 4.99 | 92.49 | 0.14 | 2.38 |

| Annexure I: Analysis report of 100 graphite bearing bed rock samples | | | | | | | | | | | | | |
|--|---------------------|--|------|---------------|------|-------|------------|------------------------------|--------------|--------|---------|-------|--------|
| SL NO | LAB SAMPLE CODE | LOCATION | BAND | SAMPLE ID | FROM | TO | LENGTH (m) | LITHOLOGY | MOISTURE (%) | VM (%) | ASH (%) | S (%) | FC (%) |
| | | | | | | | | graphite | | | | | |
| 91 | NMCI/FST/24-25/1106 | | | KN/Z-7/G-14/4 | 3 | 4 | 1 | Granite gneiss with graphite | 2.39 | 4.79 | 92.99 | 0.16 | 2.06 |
| 93 | NMCI/FST/24-25/1107 | | | KN/Z-7/G-14/5 | 18 | 19 | 1 | Granite gneiss with graphite | 1.77 | 5.34 | 92.13 | 0.15 | 2.38 |
| 94 | NMCI/FST/24-25/1108 | | | KN/Z-7/G-14/6 | 19 | 20 | 1 | Granite gneiss with graphite | 2.86 | 4.69 | 94.36 | 0.19 | 0.76 |
| 95 | NMCI/FST/24-25/1124 | Along 310° from location ABRT-769 (44Q 774530 E 2140414 N) | B-1 | KN/Z-2/G-11/1 | 0 | 1 | 1 | Granite gneiss with graphite | 0.89 | 1.64 | 88.16 | 0.17 | 10.03 |
| 96 | NMCI/FST/24-25/1125 | | | KN/Z-2/G-11/2 | 1 | 2 | 1 | Granite gneiss with graphite | 0.58 | 1.12 | 90.02 | 0.12 | 8.74 |
| 97 | NMCI/FST/24-25/1126 | | | KN/Z-2/G-11/3 | 2 | 3 | 1 | Granite gneiss with graphite | 0.58 | 1.33 | 90.9 | 0.17 | 7.6 |
| 98 | NMCI/FST/24-25/1127 | | | KN/Z-2/G-11/4 | 3 | 3.8 | 0.8 | Granite gneiss with graphite | 0.55 | 1.2 | 91.96 | 0.13 | 6.71 |
| 99 | NMCI/FST/24-25/1128 | | | KN/Z-2/G-11/5 | 134 | 135 | 1 | Granite gneiss with graphite | 0.54 | 1.34 | 93.96 | 0.14 | 4.56 |
| 100 | NMCI/FST/24-25/1129 | | | KN/Z-2/G-11/6 | 135 | 136.3 | 1.3 | Granite gneiss with graphite | 0.84 | 1.44 | 96.01 | 0.11 | 2.44 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|--|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| 0 | 0.5 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | 0.5 | Top soil | HQ | Yellowish brown in colour | 0 |
| 0.5 | 1 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | 1 | Top soil | HQ | Yellowish brown in colour | 0 |
| 1 | 1.5 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | 1.5 | Top soil | HQ | Yellowish brown in colour | 0 |
| 1.5 | 2 | 0.5 | 0.5 | 100 | 0.2 | 0.2 | 1.7 | Top soil | HQ | Yellowish brown in colour | 0 |
| | | | | | 0.3 | 0.3 | 2 | Weathered Mantle | HQ | Brownish in color with fragments of granite gneiss | 0 |
| 2 | 3 | 1 | 0.97 | 97 | 0.97 | 1 | 3 | Weathered Mantle | HQ | Brownish in color with fragments of granite gneiss | 0 |
| 3 | 4 | 1 | 0.95 | 95 | 0.95 | 1 | 4 | Weathered Mantle | HQ | Brownish in color with fragments of granite gneiss | 0 |
| 4 | 4.5 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | 4.5 | Weathered Mantle | HQ | Brownish in color with fragments of granite gneiss | 0 |
| 4.5 | 5 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | 5 | Weathered Mantle | HQ | Brownish in color with fragments of granite gneiss | 0 |
| 5 | 5.5 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | 5.5 | Weathered Mantle | HQ | Brownish in color with fragments of granite gneiss | 0 |
| 5.5 | 6 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | 6 | Weathered Mantle | HQ | Brownish in color with fragments of granite gneiss | 0 |
| 6 | 6.5 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | 6.5 | Weathered Mantle | HQ | Brownish in color with fragments of granite gneiss | 0 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|--|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| 6.5 | 7 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | 7 | Granite gneiss | HQ | Brownish white colored, coarse grained, highly fractured rock in which the gneissosity is defined by quartz feldspar rich bands. | 28 |
| 7 | 8 | 1 | 0.95 | 95 | 0.95 | 1 | 8 | Granite gneiss | HQ | Brownish white colored, coarse grained, highly fractured rock in which the gneissosity is defined by quartz feldspar rich bands. | 0 |
| 8 | 11 | 3 | 2.87 | 96 | 0.15 | 0.25 | 8.25 | Granite gneiss | HQ | Brownish white colored, coarse grained, highly fractured rock in which the gneissosity is defined by quartz feldspar rich bands. | 0 |
| | | | | | 1.85 | 1.88 | 10.13 | Leptynite | HQ | Whitish in color, coarse grained highly fractured rock containing blades of quartz | 5.32 |
| | | | | | 0.87 | 0.87 | 11 | Khondalite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the gneissosity is defined by the garnet rich layers alternate with quartz- feldspar rich layers. | 71.26 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|--|--------------|---|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| 11 | 14 | 3 | 2.79 | 93 | 0.5 | 0.6 | 11.6 | Khondalite with small amount of graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the dissiminated graphite flacks occur along the foliation plane. | 35.00 |
| | | | | | 1.7 | 1.78 | 13.38 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 55.06 |
| | | | | | 0.37 | 0.4 | 13.78 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 0.00 |
| | | | | | 0.22 | 0.22 | 14 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 59.09 |
| 14 | 17 | 3 | 3 | 100 | 1.17 | 1.17 | 15.17 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 70.94 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|--|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| | | | | | 0.5 | 0.5 | 15.67 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parralel to the plane of schistosity. | 0.00 |
| | | | | | 0.19 | 0.19 | 15.86 | Leptynite | HQ | Whitish in color, coarse granied highly fractured rock containing blades of quartz | 0.00 |
| | | | | | 1.14 | 1.14 | 17 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parralel to the plane of schistosity. The schist is intercalated with narrow quartz bands of thickness less than 3 cm. | 46.49 |
| 17 | 20 | 3 | 2.98 | 99 | 1.06 | 1.08 | 18.08 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parralel to the plane of schistosity. The schist is intercalated with narrow quartz-feldspar rich bands. | 50.93 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|---|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| | | | | | 0.54 | 0.54 | 18.62 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 40.74 |
| | | | | | 0.4 | 0.4 | 19.02 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. The schist is intercalated with narrow quartz-feldspar rich bands. | 62.50 |
| | | | | | 0.98 | 0.98 | 20 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 47.96 |
| 20 | 23 | 3 | 3 | 100 | 0.55 | 0.55 | 20.55 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 67.27 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|--|--------------|---|--------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| | | | | | 0.43 | 0.43 | 20.98 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parrallel to the plane of schistosity comtaining 5 cm thick band of quartz. | 32.56 |
| | | | | | 1.9 | 1.9 | 22.88 | Granite gneiss | HQ | Off white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 68.42 |
| | | | | | 0.12 | 0.12 | 23 | Granite gneiss with small amount of graphite | HQ | Brownish white colored coarse grained rock with the altenate layers of graphite and quartz felspar | 0.00 |
| 23 | 26 | 3 | 3 | 100 | 0.21 | 0.21 | 23.21 | Granite gneiss with small amount of graphite | HQ | Brownish white colored coarse grained rock with the altenate layers of graphite and quartz felspar | 100.00 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|---|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| | | | | | 0.24 | 0.24 | 23.45 | Granite gneiss | HQ | Off white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 83.33 |
| | | | | | 0.17 | 0.17 | 23.62 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 0.00 |
| | | | | | 0.22 | 0.22 | 23.84 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 0.00 |
| | | | | | 0.13 | 0.13 | 23.97 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 0.00 |
| | | | | | 2.03 | 2.03 | 26 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. It contains two thin bands (< 6 cm) quartzite bands within it. | 72.91 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|--|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| 26 | 29 | 3 | 3 | 100 | 0.93 | 0.93 | 26.93 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz with intercalated bands of quartzo-feldspathic graphite gneiss. | 50.54 |
| | | | | | 0.5 | 0.5 | 27.43 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where the graphite is parralel to the plane of schistosity. | 0.00 |
| | | | | | 1.21 | 1.21 | 28.64 | Granite gneiss with 0.4 cm thick bands of quartzo-feldspathic graphite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by the feldspar and quartz rich band. | 69.42 |
| | | | | | 0.06 | 0.06 | 28.7 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where the graphite is parralel to the plane of schistosity. | 0.00 |
| | | | | | 0.3 | 0.3 | 29 | Granite gneiss | HQ | Greyish colored, rockmedium to coarse grained rock where the graphite is parralel to the plane of schistosity. | 33.33 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|--|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| 29 | 32 | 3 | 3 | 100 | 0.21 | 0.21 | 29.21 | Granite gneiss | HQ | Off white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 61.90 |
| | | | | | 1.26 | 1.26 | 30.47 | Quartzo-feldspathic graphite gneiss | HQ | Quartzo-feldspathic graphite gneiss with thin quartz feldspar rich band. | 53.17 |
| | | | | | 1 | 1 | 31.47 | Enderbite (?) | HQ | Pinkish white in color+ with alternate bands of garnet rich layers and quartz feldspar rich layer. | 71 |
| | | | | | 0.53 | 0.53 | 32 | Quartzo-feldspathic graphite gneiss | HQ | Quartzo-feldspathic graphite gneiss with thin quartz feldspar rich band. | 0 |
| 32 | 35 | 3 | 2.99 | 99.67 | 0.64 | 0.64 | 32.64 | Quartzo-feldspathic graphite gneiss | HQ | Quartzo-feldspathic graphite gneiss with thin quartz feldspar rich band. | 54.69 |
| | | | | | 0.4 | 0.4 | 33.04 | Granite gneiss with graphite | HQ | Off white colored, coarse grained rock where the alternate layers of graphite rich layers and quartz feldspar rich layers were encountered | 65.00 |
| | | | | | 0.27 | 0.27 | 33.31 | Granite gneiss | HQ | Off white colored, coarse grained gneissic rock | 51.85 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|--|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| | | | | | 0.74 | 0.74 | 34.05 | Granite gneiss with graphite | HQ | Off white colored, coarse grained rock where the altenate layers of graphite rich layers and quartz felspar | 74.32 |
| | | | | | 0.25 | 0.26 | 34.31 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored rock, medium to coarse grained rock where the graphite mineralization is parralel to the plane of schistosity. | 0.00 |
| | | | | | 0.69 | 0.69 | 35 | Khondalite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the gneissosity is defined by garnet rich layers alternate with quartz- feldspar rich layers. | 65.22 |
| 35 | 37 | 2 | 2 | 100 | 1.93 | 1.93 | 36.93 | Khondalite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the gneissosity is defined by the garnet rich layers alternate with quartz- feldspar rich layers. | 0 |
| | | | | | 0.07 | 0.07 | 37 | Mica schist | HQ | Dark colored, coarse grained rock in which the flaky minerals define the schistosity. | 0 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|---|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| 37 | 39 | 2 | 1.86 | 93 | 0.68 | 0.74 | 37.74 | Mica schist | HQ | Dark colored, coarse grained rock in which the flaky minerals define the schistosity. | 0 |
| | | | | | 0.54 | 0.56 | 38.3 | Enderbite (?) with very thin band of mica schist at bottom. | HQ | Pinkish white in color+ with alternate bands of garnet rich layers and quartz feldspar. | 0 |
| | | | | | 0.64 | 0.7 | 39 | Granite gneiss | HQ | Off white colored, coarse grained rock where the gneissosity is defined by the coloured feldspar and quartz. | 42.86 |
| 39 | 42 | 3 | 2.9 | 96.67 | 2.9 | 3 | 42 | Khondalite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the gneissosity is defined by the garnet rich layers alternate with quartz- feldspar rich layers. | 59.67 |
| 42 | 45 | 3 | 2.9 | 96.67 | 2.9 | 3 | 45 | Khondalite | HQ | Reddish white colored, medium to coarse grained sillimanite bearing highly fractured rock where the gneissosity is defined by the garnet rich layers alternate with quartz- feldspar rich layers. | 21 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|--|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| 45 | 48 | 3 | 2.94 | 98.00 | 1.2 | 1.2 | 46.2 | Khondalite | HQ | Reddish white colored, medium grained sillimanite bearing highly fractured rock where the gneissosity is defined by garnet rich layers alternate with quartz-feldspar rich layers. | 53.33 |
| | | | | | 1.74 | 1.8 | 48 | Granite gneiss with small amount of graphite | HQ | Brownish white colored, coarse grained rock containing muscovite and graphite in its minerology. At places augen shaped quartz is recorded. | 36.67 |
| 48 | 51 | 3 | 2.72 | 90.67 | 0.88 | 0.91 | 48.91 | Granite gneiss | HQ | Brownish white colored, coarse grained rock showing gneissose bands of quartz and feldspar. | 20.88 |
| | | | | | 0.7 | 0.78 | 49.69 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 14.10 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|--|--------------|--|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| | | | | | 0.88 | 1.01 | 50.7 | Khondalite with minor amount of graphite | HQ | Medium grained, pinkish white colored highly fractured rock with alternatieve bands of garnet rich layers and quartz feldspar rich layer. Dessiminated flakes of graphite occurs within the rock.. | 0 |
| | | | | | 0.26 | 0.3 | 51 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parralel to the plane of schistosity. | 33.33 |
| 51 | 54 | 3 | 2.82 | 94.00 | 2.82 | 3 | 54 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained garnetiferous rock where flakes of graphite and mica are parralel to the plane of schistosity. Few quartz rich bands are interveining the lithounit. | 65 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|---|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| 54 | 57 | 3 | 2.99 | 99.67 | 0.66 | 0.66 | 54.66 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained, garnetiferous rock where the flakes of graphite and mica are parralel to the plane of schistosity. Few quartz rich bands are interveining the lithounit. | 98.48 |
| | | | | | 0.47 | 0.48 | 55.14 | Granite gneiss | HQ | Granite gneiss with 7 cm thick band of mica schist | 77.08 |
| | | | | | 0.87 | 0.87 | 56.01 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parralel to the plane of schistosity. | 80.46 |
| | | | | | 0.21 | 0.21 | 56.22 | Quartzite | HQ | Colorless, coarse grained rock composed of quartz | 66.67 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|---|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| | | | | | 0.78 | 0.78 | 57 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained garnetiferous rock where the flakes of graphite and mica are parralel to the plane of schistosity. Numerous quartz rich bands are interveining the lithounit. | 97.44 |
| 57 | 60 | 3 | 2.99 | 99.67 | 0.65 | 0.66 | 57.66 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained garnetiferous rock where flakes of graphite and mica are parralel to the plane of schistosity. Numerous quartz rich bands are interveining the lithounit. | 74.24 |
| | | | | | 0.22 | 0.22 | 57.88 | Quartzite | HQ | Medium to coarse grained, greenish colored, containing tiny crystals of garnet. | 100 |

| Annexure-II: Summarized litholog sheet of KKBH-1, Kanapulisi Block, Rayagada, Odisha | | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|-----------------------|---|--------------|--|-------|
| BOREHOLE NO. - KKBH-1 | | | | | | | | DATE OF COMMENCEMENT : 07.12.2024 | | | |
| LATITUDE - 19°20'53.354" | | | | | | | | DATE OF COMPLETION: 12.12.2024 | | | |
| LONGITUDE - 83°36'15.486" | | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: 5.44 m | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | FINAL DEPTH (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | | |
| | | | | | 1.4 | 1.4 | 59.28 | Graphite bearing quartzite | HQ | Medium to coarse grained, greenish colored, containing graphite and tiny crystals of garnet. | 75 |
| | | | | | 0.39 | 0.39 | 59.67 | Quartzite | HQ | Medium to coarse grained, greenish colored, containing tiny crystals of garnet. | 89.74 |
| | | | | | 0.33 | 0.33 | 60 | Graphite bearing quartzite | HQ | Medium to coarse grained, greenish colored, containing graphite and tiny crystals of garnet. | 33.33 |
| 60 | 63 | 3 | 2.98 | 99.33 | 2.98 | 3 | 63 | Quartzite | HQ | Medium to coarse grained, greenish colored, containing muscovite and tiny crystals of garnet. | 53.67 |
| 63 | 65 | 2 | | 0.00 | 1.96 | 2 | 65 | Quartzite | HQ | Medium to coarse grained, colourless rock containing muscovite and tiny crystals of garnet. | 92.5 |

| Annexure III: Summarized litholog sheet of KKBH-2, Kanapulisi Block, Rayagada, Odisha, | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KKBH-2 | | | | | | | DATE OF COMMENCEMENT : 18.12.2024 | | | |
| LATITUDE - 19°20'50.964" | | | | | | | DATE OF COMPLETION: 22.12.2024 | | | |
| LONGITUDE - 83°36'17.114" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| 0 | 0.5 | 0.5 | 0.45 | 90 | 0.45 | 0.5 | Top soil | HQ | Brownish in colour | 0 |
| 0.5 | 1 | 0.5 | 0.45 | 90 | 0.45 | 0.5 | Top soil | HQ | Brownish in colour | 0 |
| 1 | 1.5 | 0.5 | 0.45 | 90 | 0.45 | 0.5 | Top soil | HQ | Brownish in colour | 0 |
| 1.5 | 2 | 0.5 | 0.45 | 90 | 0.45 | 0.5 | Top soil | HQ | Brownish in colour | 0 |
| 2 | 2.5 | 0.5 | 0.45 | 90 | 0.45 | 0.5 | Top soil | HQ | Brownish yellow in colour | 0 |
| 2.5 | 3 | 0.5 | 0.45 | 90 | 0.45 | 0.5 | Top soil | HQ | Brownish yellow in colour | 0 |
| 3 | 3.5 | 0.5 | 0.45 | 90 | 0.45 | 0.5 | Top soil | HQ | Brownish yellow in colour | 0 |
| 3.5 | 4 | 0.5 | 0.45 | 90 | 0.45 | 0.5 | Top soil | HQ | Brownish yellow in colour | 0 |
| 4 | 6 | 2 | 2 | 100 | 0.75 | 0.75 | Top soil | HQ | Brownish yellow in colour | 0 |
| | | | | | 0.7 | 0.7 | Weathered mantle | HQ | Greyish in colour containg fragments of granite gneiss | 45.71 |
| | | | | | 0.55 | 0.55 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored rock, medium to coarse grained where graphite flakes are parallel to the plane of schistosity. | 63.64 |
| 6 | 9 | 3 | 2.98 | 99.33 | 0.9 | 0.9 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored rock, medium to coarse grained where graphite flakes are | 0 |

| Annexure III: Summarized litholog sheet of KKBH-2, Kanapulisi Block, Rayagada, Odisha, | | | | | | | | | | |
|--|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KKBH-2 | | | | | | | DATE OF COMMENCEMENT : 18.12.2024 | | | |
| LATITUDE - 19°20'50.964" | | | | | | | DATE OF COMPLETION: 22.12.2024 | | | |
| LONGITUDE - 83°36'17.114" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | parallel to the plane of schistosity. | |
| | | | | | 0.65 | 0.65 | Granite gneiss with graphite | HQ | Brownish white colored, coarse grained rock with alternated layers of graphite and quartz feldspar | 0 |
| | | | | | 1.43 | 1.45 | Granite gneiss | HQ | Brownish white colored, coarse grained rock with alternated layers of graphite and quartz feldspar | 0 |
| 9 | 12 | 3 | 2.99 | 99.67 | 0.42 | 0.42 | Granite gneiss with graphite | HQ | Brownish white colored, coarse grained rock with alternated layers of graphite and quartz feldspar | 0 |
| | | | | | 0.43 | 0.43 | Quartz-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 0 |

| Annexure III: Summarized litholog sheet of KKBH-2, Kanapulisi Block, Rayagada, Odisha, | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KKBH-2 | | | | | | | DATE OF COMMENCEMENT : 18.12.2024 | | | |
| LATITUDE - 19°20'50.964" | | | | | | | DATE OF COMPLETION: 22.12.2024 | | | |
| LONGITUDE - 83°36'17.114" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | 1.1 | 1.1 | Granite gneiss with graphite | HQ | Brownish white colored, coarse grained rock with alternate layers of graphite and quartz felspar | 0 |
| | | | | | 0.97 | 0.97 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 0 |
| | | | | | 0.07 | 0.08 | Mica schist | HQ | Dark colored, coarse grained rock in which the flaky minerals define the schistosity. | 0 |
| 12 | 15 | 3 | 2.84 | 94.67 | 0.1 | 0.16 | Mica schist | HQ | Dark colored, coarse grained rock in which the flaky minerals define the schistosity. | 0 |
| | | | | | 0.14 | 0.15 | Mafic granulite | HQ | Medium grained black coloured rock showing salt and pepper appearance | 0 |
| | | | | | 0.28 | 0.29 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored rock, medium to coarse grained where graphite flakes are parallel to the plane of schistosity. | 0 |

Annexure III: Summarized litholog sheet of KKBH-2, Kanapulisi Block, Rayagada, Odisha,

| BOREHOLE NO. - KKBH-2 | | | | | | | DATE OF COMMENCEMENT : 18.12.2024 | | | |
|---------------------------|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|--|-------|
| LATITUDE - 19°20'50.964" | | | | | | | DATE OF COMPLETION: 22.12.2024 | | | |
| LONGITUDE - 83°36'17.114" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | 2.32 | 2.4 | Granite gneiss | HQ | Brownish white colored, coarse grained, Containing 17 cm quartz rich band at the bottom. | 0 |
| 15 | 18 | 3 | 2.94 | 98.00 | 2.94 | 3 | Garnetiferous quartzite | HQ | Medium to coarse grained, pinkish white in colored containing tiny crystals of garnet. | 0 |
| 18 | 21 | 3 | 2.95 | 98.33 | 2.95 | 3 | Garnetiferous quartzite | HQ | Medium to coarse grained, pinkish white in colored containing tiny crystals of garnet. | 0 |
| 21 | 24 | 3 | 3 | 100.00 | 3 | 3 | Garnetiferous quartzite | HQ | Medium to coarse grained, pinkish white in colored containing tiny crystals of garnet. | 0 |
| 24 | 27 | 3 | 2.95 | 98.33 | 0.2 | 0.23 | Garnetiferous quartzite | HQ | Medium to coarse grained, pinkish white in colored containing tiny crystals of garnet. | 0 |
| | | | | | 0.2 | 0.21 | Mafic granulite | HQ | Medium grained black coloured rock. | 95.24 |
| | | | | | 2.55 | 2.56 | Garnetiferous quartzite | HQ | Medium to coarse grained, pinkish white in colored containing tiny crystals of garnet. | 69.92 |

| Annexure III: Summarized litholog sheet of KKBH-2, Kanapulisi Block, Rayagada, Odisha, | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KKBH-2 | | | | | | | DATE OF COMMENCEMENT : 18.12.2024 | | | |
| LATITUDE - 19°20'50.964" | | | | | | | DATE OF COMPLETION: 22.12.2024 | | | |
| LONGITUDE - 83°36'17.114" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| 27 | 30 | 3 | 2.98 | 99.33 | 2.98 | 3 | Garnetiferous quartzite | HQ | Medium to coarse grained, pinkish white in colored containing tiny crystals of garnet. | 38.33 |
| 30 | 33 | 3 | 3 | 100.00 | 1.2 | 1.2 | Garnetiferous quartzite | HQ | Medium to coarse grained, pinkish white in colored containing tiny crystals of garnet. | 25.00 |
| | | | | | 1.8 | 1.8 | Granite gneiss | HQ | Brownish white colored, coarse grained rock. Containing quartz and feldspar. | 83.89 |
| 33 | 36 | 3 | 3 | 100.00 | 2.36 | 2.36 | Granite gneiss | HQ | Brownish white colored, coarse grained fractured rock. Containing quartz and feldspar. | 39.41 |
| | | | | | 0.64 | 0.64 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored rock, medium to coarse grained where graphite flakes are parallel to the plane of schistosity. | 0 |
| 36 | 39 | 3 | 3 | 100.00 | 2.98 | 3 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored rock, medium to coarse grained where graphite flakes are parallel to the plane of schistosity. Few quartzite bands | 83 |

| Annexure III: Summarized litholog sheet of KKBH-2, Kanapulisi Block, Rayagada, Odisha, | | | | | | | | | | |
|--|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KKBH-2 | | | | | | | DATE OF COMMENCEMENT : 18.12.2024 | | | |
| LATITUDE - 19°20'50.964" | | | | | | | DATE OF COMPLETION: 22.12.2024 | | | |
| LONGITUDE - 83°36'17.114" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | present within the rock. | |
| 39 | 42 | 3 | 3 | 100.00 | 0.75 | 0.75 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 77.33 |
| | | | | | 0.44 | 0.44 | Granite gneiss | HQ | Brownish white colored, coarse grained rock. Containing quartz, feldspar and abundant mica. | 77.27 |
| | | | | | 0.44 | 0.44 | Garnetiferous quartzite | HQ | Medium to coarse grained, pinkish white in colored containing tiny crystals of garnet. | 79.55 |
| | | | | | 0.79 | 0.79 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored rock, medium to coarse grained where graphite flakes are parallel to the plane of schistosity. | 51.90 |

| Annexure III: Summarized litholog sheet of KKBH-2, Kanapulisi Block, Rayagada, Odisha, | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KKBH-2 | | | | | | | DATE OF COMMENCEMENT : 18.12.2024 | | | |
| LATITUDE - 19°20'50.964" | | | | | | | DATE OF COMPLETION: 22.12.2024 | | | |
| LONGITUDE - 83°36'17.114" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | 0.58 | 0.58 | Granite gneiss with graphite | HQ | Brownish white colored, coarse grained rock where the alternate layers of graphite rich layers and few quartzite bands present at bottom. | 74.14 |
| 42 | 45 | 3 | 2.84 | 94.67 | 0.24 | 0.27 | Garnetiferous quartzite | HQ | Medium to coarse grained, pinkish white colored rock containing tiny crystals of garnet. | 0 |
| | | | | | 1.9 | 1.96 | Granite gneiss with graphite | HQ | Brownish white colored, coarse grained rock where the alternate layers of graphite present | 48.98 |
| | | | | | 0.42 | 0.46 | Garnetiferous quartzite | HQ | Medium to coarse grained, pinkish white colored rock containing tiny crystals of garnet. | 0.00 |
| | | | | | 0.28 | 0.31 | Granite gneiss with graphite | HQ | Brownish white colored, coarse grained rock where the alternate layers of graphite present | 54.84 |
| 45 | 46 | 1 | | | 0.95 | 1 | Granite gneiss with graphite | HQ | Brownish white colored, coarse grained highly fractured rock where the alternate | 0 |

| Annexure III: Summarized litholog sheet of KKBH-2, Kanapulisi Block, Rayagada, Odisha, | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KKBH-2 | | | | | | | DATE OF COMMENCEMENT : 18.12.2024 | | | |
| LATITUDE - 19°20'50.964" | | | | | | | DATE OF COMPLETION: 22.12.2024 | | | |
| LONGITUDE - 83°36'17.114" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | layers of graphite present | |
| 46 | 46.5 | 0.5 | | | 0.4 | 0.5 | Granite gneiss with graphite | HQ | Brownish white colored, coarse grained highly fractured rock where the alternate layers of graphite present | 0 |
| 46.5 | 47 | 0.5 | | | 0.4 | 0.5 | Granite gneiss with graphite | HQ | Brownish white colored, coarse grained highly fractured rock where the alternate layers of graphite present | 0 |
| 47 | 48.5 | 1.5 | | | 0.18 | 0.18 | Quartzite | HQ | Whitish colored coarse grained rock composed of quartz | 77.78 |
| | | | | | 0.3 | 0.34 | Graphite bearing quartzite | HQ | Brownish white colored, coarse grained highly fractured rock where the alternate layers of graphite present | 0.00 |
| | | | | | 0.26 | 0.31 | Quartzite | HQ | Whitish colored coarse grained rock composed of quartz and garnet | 0.00 |

| Annexure III: Summarized litholog sheet of KKBH-2, Kanapulisi Block, Rayagada, Odisha, | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KKBH-2 | | | | | | | DATE OF COMMENCEMENT : 18.12.2024 | | | |
| LATITUDE - 19°20'50.964" | | | | | | | DATE OF COMPLETION: 22.12.2024 | | | |
| LONGITUDE - 83°36'17.114" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | 0.62 | 0.67 | Granite gneiss with graphite | HQ | Brownish white colored, coarse grained highly fractured rock where the alternate layers of graphite present | 0.00 |
| 48.5 | 49.5 | 1 | | | 0.46 | 0.46 | Granite gneiss | HQ | Whitish colored rock composed of alternate quartz and feldspar rich layers | 0.00 |
| | | | | | 0.54 | 0.54 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored coarse grained rock in which the crystalline graphite flakes are parallel to the plane of schistosity | 24.07 |
| 49.5 | 50 | 0.5 | | | 0.5 | 0.5 | Ultrabasic (?) | HQ | Greenish colored highly fractured rock containing soapy feeling material (Serpentine?) | 0 |
| 50 | 51 | 1 | | | 0.6 | 0.68 | Ultrabasic (?) | HQ | Greenish colored highly fractured rock containing soapy feeling material (Serpentine?) | 0 |
| | | | | | 0.28 | 0.32 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored coarse grained rock in which the crystalline graphite flakes are parallel to | 65.63 |

| Annexure III: Summarized litholog sheet of KKBH-2, Kanapulisi Block, Rayagada, Odisha, | | | | | | | | | | |
|--|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KKBH-2 | | | | | | | DATE OF COMMENCEMENT : 18.12.2024 | | | |
| LATITUDE - 19°20'50.964" | | | | | | | DATE OF COMPLETION: 22.12.2024 | | | |
| LONGITUDE - 83°36'17.114" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | the plane of schistosity | |
| 51 | 54 | 3 | | | 1.73 | 1.86 | Granite gneiss with graphite | HQ | Whitish colored, composed of alternate bands of quartz and feldspar in which graphite flakes occur along the foliation plane. | 33.33 |
| | | | | | 1 | 1.14 | Quartzite | HQ | Whitish colored coarse grained rock composed of quartz and garnet | 31.58 |
| 54 | 55.5 | 1.5 | | | 1.42 | 1.5 | Granite gneiss | HQ | Greyish white colored rock containing mica | 28.67 |
| 55.5 | 57 | 1.5 | | | 1.48 | 1.5 | Granite gneiss | HQ | Greyish white colored rock containing mica | 42.00 |

| Annexure -IV: Summarized litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KKBH-3 | | | | | | | DATE OF COMMENCEMENT : 12.12.2024 | | | |
| LATITUDE - 19°20'55.158" | | | | | | | DATE OF COMPLETION: 15.12.2024 | | | |
| LONGITUDE - 83°36'11.654" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| 0 | 0.5 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | Top soil | HQ | Brownish colour | 0 |
| 0.5 | 1 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | Top soil | HQ | Brownish colour | 0 |
| 1 | 1.5 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | Top soil | HQ | Brownish colour | 0 |
| 1.5 | 2 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | Top soil | HQ | Brownish colour | 0 |
| 2 | 2.5 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | Top soil | HQ | Brownish colour | 0 |
| 2.5 | 3 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | Top soil | HQ | Brownish colour | 0 |
| 3 | 4 | 1 | 1 | 100 | 1 | 1 | Top soil | HQ | Brownish colour | 0 |
| 4 | 5 | 1 | 0.99 | 99 | 0.69 | 0.7 | Top soil | HQ | Brownish colour | 0 |
| | | | | | 0.3 | 0.3 | Weathered mantle | HQ | Brownish in color with fragments of granite gneiss | 0 |
| 5 | 6.5 | 1.5 | 1.42 | 94.67 | 1.42 | 1.5 | Weathered mantle | HQ | Brownish in color with fragments of granite gneiss | 0 |
| 6.5 | 8 | 1.5 | 1.43 | 95.33 | 0.53 | 0.56 | Weathered mantle | HQ | Brownish in color with fragments of granite gneiss | 0 |
| | | | | | 0.9 | 0.94 | Granite gneiss | HQ | Brownish white colored, coarse grained highly fractured rock. Containing quartz and feldspar with opaque minerals. | 0 |
| 8 | 9 | 1 | 0.95 | 95 | 0.95 | 1 | Granite gneiss | HQ | Brownish white colored, coarse grained highly fractured rock. Containing quartz and feldspar with opaque minerals. | 0 |
| 9 | 10 | 1 | 0.98 | 98 | 0.98 | 1 | Granite gneiss | HQ | Brownish white colored, coarse | 47 |

| Annexure -IV: Summarized litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KKBH-3 | | | | | | | DATE OF COMMENCEMENT : 12.12.2024 | | | |
| LATITUDE - 19°20'55.158" | | | | | | | DATE OF COMPLETION: 15.12.2024 | | | |
| LONGITUDE - 83°36'11.654" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | grained highly fractured rock. Containing quartz and feldspar with opaque minerals. | |
| 10 | 12.5 | 2.5 | 2.3 | 92 | 2.3 | 2.5 | Granite gneiss | HQ | Pinkish white in color, coarse grained rock shows alternate bands of quartz and feldspar. | 45.6 |
| 12.5 | 15.5 | 3 | 3 | 100 | 3 | 3 | Granite gneiss | HQ | Pinkish white in color, coarse grained rock shows alternate bands of quartz and feldspar. | 71.67 |
| 15.5 | 18.5 | 3 | 2.98 | 99.33 | 2.98 | 3 | Granite gneiss | HQ | Pinkish white in color, coarse grained rock shows alternate bands of quartz and feldspar. | 65.67 |
| 18.5 | 20 | 1.5 | 1.49 | 99.33 | 1.49 | 1.5 | Granite gneiss | HQ | Pinkish white in color, coarse grained rock shows alternate bands of quartz and feldspar. | 43.33 |
| 20 | 21.5 | 1.5 | 1.46 | 97.33 | 1.46 | 1.5 | Granite gneiss | HQ | Pinkish white in color, coarse grained rock shows alternate bands of quartz and feldspar. | 46.67 |
| 21.5 | 23 | 1.5 | 1.4 | 93.33 | 1.4 | 1.5 | Granite gneiss | HQ | Pinkish white in color, coarse grained rock shows alternate bands of quartz and feldspar. | 74.00 |
| 23 | 24.5 | 1.5 | 1.42 | 94.67 | 0.87 | 0.93 | Granite gneiss | HQ | Pinkish white in color, coarse grained rock shows alternate bands of quartz and feldspar. | 22.58 |
| | | | | | 0.55 | 0.57 | Garnetiferous | HQ | Medium grained, | 17.54 |

| Annexure -IV: Summarized litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KKBH-3 | | | | | | | DATE OF COMMENCEMENT : 12.12.2024 | | | |
| LATITUDE - 19°20'55.158" | | | | | | | DATE OF COMPLETION: 15.12.2024 | | | |
| LONGITUDE - 83°36'11.654" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | quartzite | | colorless, fractured rock containing pinkish garnet (grosular) | |
| 24.5 | 26 | 1.5 | 1.47 | 98 | 1.47 | 1.5 | Garnetiferous quartzite | HQ | Medium grained, colorless, highly fractured rock containing pinkish garnet (grosular) | 14 |
| 26 | 27.5 | 1.5 | 1.34 | 89.33 | 0.23 | 0.26 | Garnetiferous quartzite | HQ | Medium grained, colorless, highly fractured rock containing pinkish garnet (grosular) | 0 |
| | | | | | 1.11 | 1.24 | Granite gneiss | HQ | Medium to coarse grained colorless highly fractured rock. | 0 |
| 27.5 | 28 | 0.5 | 0.45 | 90.00 | 0.45 | 0.5 | Garnetiferous quartzite | HQ | Medium grained colorless highly fractured rock containing pinkish garnet (grosular) | 0 |
| 28 | 28.5 | 0.5 | 0.45 | 90.00 | 0.45 | 0.5 | Garnetiferous quartzite | HQ | Medium grained colorless highly fractured rock containing pinkish garnet (grosular) | 0 |
| 28.5 | 29 | 0.5 | 0.45 | 90.00 | 0.45 | 0.5 | Garnetiferous quartzite | HQ | Medium grained colorless highly fractured rock containing pinkish garnet (grosular) | 0 |
| 29 | 29.5 | 0.5 | 0.45 | 90.00 | 0.45 | 0.5 | Garnetiferous quartzite | HQ | Medium grained colorless highly fractured rock | 0 |

| Annexure -IV: Summarized litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KKBH-3 | | | | | | | DATE OF COMMENCEMENT : 12.12.2024 | | | |
| LATITUDE - 19°20'55.158" | | | | | | | DATE OF COMPLETION: 15.12.2024 | | | |
| LONGITUDE - 83°36'11.654" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | containing pinkish garnet (grosular) | |
| 29.5 | 30 | 0.5 | 0.45 | 90.00 | 0.45 | 0.5 | Garnetiferous quartzite | HQ | Medium grained colorless highly fractured rock containing pinkish garnet (grosular) | 0 |
| 30 | 30.5 | 0.5 | 0.45 | 90.00 | 0.45 | 0.5 | Granite gneiss | HQ | Medium to coarse grained brownish colored highly fractured rock. | 0 |
| 30.5 | 31 | 0.5 | 0.45 | 90.00 | 0.45 | 0.5 | Granite gneiss | HQ | Medium to coarse grained whitish colored highly fractured rock. | 0 |
| 31 | 32 | 1 | 1 | 100.00 | 1 | 1 | Granite gneiss | HQ | Medium to coarse grained brownish colored highly fractured rock. | 27 |
| 32 | 33.5 | 1.5 | 1.5 | 100.00 | 0.5 | 0.5 | Granite gneiss | HQ | Medium to coarse grained brownish colored highly fractured rock. | 46 |
| | | | | | 1 | 1 | Garnetiferous quartzite | HQ | Medium grained, whitish colour rock containing pinkish garnet (grosular) and biotite. | 60 |
| 33.5 | 36.5 | 3 | 2.97 | 99.00 | 2.97 | 3 | Khondalite | HQ | Reddish white colored, medium grained sillimanite bearing rock where the gneissosity is defined | 68.67 |

| Annexure -IV: Summarized litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KKBH-3 | | | | | | | DATE OF COMMENCEMENT : 12.12.2024 | | | |
| LATITUDE - 19°20'55.158" | | | | | | | DATE OF COMPLETION: 15.12.2024 | | | |
| LONGITUDE - 83°36'11.654" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | by the garnet rich layers alternate with quartz- feldspar. | |
| 36.5 | 39.5 | 3 | 2.95 | 98.33 | 2.95 | 3 | Khondalite | HQ | Reddish white colored, medium grained sillimanite bearing rock where the gneissosity is defined by garnet rich layers alternate with quartz- feldspar. | 60.67 |
| 39.5 | 42.5 | 3 | 2.95 | 98.33 | 2.95 | 3 | Khondalite | HQ | Reddish white colored, medium grained sillimanite bearing highly fractured rock where the gneissosity is defined by garnet rich layers alternate with quartz- feldspar. | 33.67 |
| 42.5 | 45.5 | 3 | 2.89 | 96.33 | 0.93 | 1 | Khondalite | HQ | Reddish white colored, medium grained sillimanite bearing highly fractured rock where the gneissosity is defined by garnet rich layers alternate | 30 |

| Annexure -IV: Summarized litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KKBH-3 | | | | | | | DATE OF COMMENCEMENT : 12.12.2024 | | | |
| LATITUDE - 19°20'55.158" | | | | | | | DATE OF COMPLETION: 15.12.2024 | | | |
| LONGITUDE - 83°36'11.654" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | with quartz- feldspar. | |
| | | | | | 1.96 | 2 | Granite gneiss | HQ | Medium to coarse grained pinkish white colored rock. | 82.5 |
| 45.5 | 48.5 | 3 | 2.97 | 99.00 | 2.27 | 2.3 | Granite gneiss | HQ | Medium to coarse grained pinkish white colored rock. | 58.70 |
| | | | | | 0.7 | 0.7 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 14.29 |
| 48.5 | 51.5 | 3 | 2.99 | 99.67 | 0.85 | 0.85 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 74.12 |
| | | | | | 0.57 | 0.58 | Granite gneiss | HQ | Medium to coarse grained pinkish white colored rock. | 75.86 |
| | | | | | 1.57 | 1.57 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. small bands of quartz and mica also present.($<10\text{cm}$) | 85.35 |

| Annexure -IV: Summarized litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|---|--------|
| BOREHOLE NO. - KKBH-3 | | | | | | | DATE OF COMMENCEMENT : 12.12.2024 | | | |
| LATITUDE - 19°20'55.158" | | | | | | | DATE OF COMPLETION: 15.12.2024 | | | |
| LONGITUDE - 83°36'11.654" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| 51.5 | 54.5 | 3 | 2.99 | | 0.05 | 0.05 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 0.00 |
| | | | | | 0.24 | 0.24 | Quartzite | HQ | Medium grained colorless highly fractured rock containing pinkish garnet (grosular) | 0.00 |
| | | | | | 1.66 | 1.66 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. Numerous bands of quartzite are also recorded. | 63.25 |
| | | | | | 0.23 | 0.24 | Granite gneiss with graphite | | Medium to coarse grained brownish colored highly fractured rock containing biotite and graphite. | 0.00 |
| | | | | | 0.81 | 0.81 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are | 100.00 |

| Annexure -IV: Summarized litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KKBH-3 | | | | | | | DATE OF COMMENCEMENT : 12.12.2024 | | | |
| LATITUDE - 19°20'55.158" | | | | | | | DATE OF COMPLETION: 15.12.2024 | | | |
| LONGITUDE - 83°36'11.654" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | parallel to the plane of schistosity. | |
| 54.5 | 57.5 | 3 | 3 | | 0.2 | 0.2 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 65.00 |
| | | 0 | | | 2.8 | 2.8 | Granite gneiss | HQ | Medium to coarse grained pinkish white colored rock. | 53.57 |
| 57.5 | 60.5 | 3 | 2.46 | | 0.5 | 0.58 | Quartzite | HQ | Medium grained colorless highly fractured rock containing pinkish garnet (grosular) | 27.59 |
| | | | | | 0.4 | 0.46 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 86.96 |
| | | | | | 0.3 | 0.35 | Quartzite | HQ | Medium grained colorless highly fractured rock containing pinkish garnet (grosular) | 0.00 |
| | | | | | 0.89 | 0.94 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 10.64 |
| | | | | | 0.37 | 0.67 | Quartzite | HQ | Medium grained | 0 |

| Annexure -IV: Summarized litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KKBH-3 | | | | | | | DATE OF COMMENCEMENT : 12.12.2024 | | | |
| LATITUDE - 19°20'55.158" | | | | | | | DATE OF COMPLETION: 15.12.2024 | | | |
| LONGITUDE - 83°36'11.654" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | colorless highly fractured rock containing pinkish garnet (grosular) | |
| THE BOREHOLE WAS CLOSED AT 60.5 m DEPTH IN QUARZITE ON 15.12.2024 | | | | | | | | | | |

| Annexure -V: Summarised litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|-----------------|-------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KTBH-1 | | | | | | | DATE OF COMMENCEMENT : 25.12.2024 | | | |
| LATITUDE - 19°20'18.8" | | | | | | | DATE OF COMPLETION: 02.01.2025 | | | |
| LONGITUDE - 83°36'45.4" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| 0 | 0.5 | 0.5 | 0.46 | 92 | 0.46 | 0.5 | Top Soil | HQ | Reddish brown in colour | |
| 0.5 | 1 | 0.5 | 0.46 | 92 | 0.46 | 0.5 | Top Soil | HQ | Reddish brown in colour | |
| 1 | 1.5 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | Top Soil | HQ | Reddish brown in colour | |
| 1.5 | 2 | 0.5 | 0.44 | 88 | 0.44 | 0.5 | Top Soil | HQ | Brownish yellow in colour | |
| 2 | 2.5 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | Top Soil | HQ | Brownish yellow in colour | |
| 2.5 | 3 | 0.5 | 0.47 | 94 | 0.47 | 0.5 | Top Soil | HQ | Yellowish white in colour | |
| 3 | 3.5 | 0.5 | 0.5 | 100 | 0.5 | 0.5 | Top Soil | HQ | Yellowish white in colour | |
| 3.5 | 4 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Top Soil | HQ | Yellowish white in colour | |
| 4 | 5 | 1 | 0.9 | 90 | 0.9 | 1 | Weathered mantle | HQ | Reddish in colour | |
| 5 | 6 | 1 | 0.87 | 87.00 | 0.87 | 1 | Weathered mantle | HQ | Reddish in colour | |
| 6 | 7 | 1 | 0.94 | 94.00 | 0.94 | 1 | Weathered mantle | HQ | Reddish in colour | |
| 7 | 7.5 | 0.5 | 0.4 | 80 | 0.4 | 0.5 | Weathered mantle | HQ | Reddish in colour with fragments of granite gneiss | |
| 7.5 | 8 | 0.5 | 0.45 | 90 | 0.45 | 0.5 | Weathered mantle | HQ | Reddish in colour with fragments of granite gneiss | |
| 8 | 9 | 1 | 0.97 | 97 | 0.97 | 1 | Granite gneiss | HQ | Coarse grained, brownish white in colour containing muscovite | |

| Annexure -V: Summarised litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-1 | | | | | | | DATE OF COMMENCEMENT : 25.12.2024 | | | |
| LATITUDE - 19°20'18.8" | | | | | | | DATE OF COMPLETION: 02.01.2025 | | | |
| LONGITUDE - 83°36'45.4" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| 9 | 10 | 1 | 0.94 | 94 | 0.94 | 1 | Granite gneiss | HQ | Coarse grained, brownish white in colour containing muscovite and opeaques | 30 |
| 10 | 11.5 | 1.5 | 1.49 | 99.33 | 1.49 | 1.5 | Granite gneiss | HQ | Coarse grained, brownish white in colour containing muscovite and opeaques | |
| 11.5 | 12 | 0.5 | 0.42 | 84 | 0.42 | 0.5 | Granite gneiss | HQ | Coarse grained, brownish white in colour containing muscovite and opeaques | 40 |
| 12 | 13 | 1 | 0.96 | 96 | 0.96 | 1 | Granite gneiss | HQ | Coarse grained, brownish white in colour containing muscovite and opeaques | 61.29 |
| 13 | 14 | 1 | 0.93 | 93 | 0.27 | 0.31 | Granite gneiss | HQ | Coarse grained, brownish white in colour containing muscovite and opeaques | 66.67 |
| | | | | | 0.66 | 0.69 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 71.33 |
| 14 | 15.5 | 1.5 | 1.49 | 99.33 | 1.49 | 1.5 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 54.67 |
| 15.5 | 18.5 | 3 | 2.85 | 95 | 2.85 | 3 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | |
| 18.5 | 21.5 | 3 | 2.89 | 96.33 | 0.18 | 0.21 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | |
| | | | | | 0.24 | 0.25 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the dessiminated graphite flacks occur along the foliation plane. | |
| | | | | | 0.46 | 0.48 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | |
| | | | | | 0.51 | 0.52 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite | |

| Annexure -V: Summarised litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-1 | | | | | | | DATE OF COMMENCEMENT : 25.12.2024 | | | |
| LATITUDE - 19°20'18.8" | | | | | | | DATE OF COMPLETION: 02.01.2025 | | | |
| LONGITUDE - 83°36'45.4" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | | | bearing rock where the dessimated graphite flacks occur along the foliation plane. | |
| | | | | | 1.5 | 1.54 | Granite gneiss | HQ | Coarse grained, brownish white in colour, highly fragmented containing muscovite and opeaque | 17.33 |
| 21.5 | 24.5 | 3 | 2.75 | 91.67 | 2.75 | 3 | Granite gneiss | HQ | Coarse grained, brownish white in colour, highly fragmented containing augen shaped quartz at the top | 80.00 |
| 24.5 | 27.5 | 3 | 2.89 | 96.33 | 2.89 | 3 | Garnetiferous quartzite | HQ | Medium grained colorless rock containing pinkish garnet (grosular) | 88.33 |
| 27.5 | 30.5 | 3 | 2.98 | 99.33 | 2.98 | 3 | Garnetiferous quartzite | HQ | Medium grained colorless rock containing pinkish garnet (grosular) | 70.00 |
| 30.5 | 33.5 | 3 | 2.98 | 99.33 | 2.98 | 3 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 72.50 |
| 33.5 | 35.5 | 2 | 1.7 | 85.00 | 1.7 | 2 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 73.00 |
| 35.5 | 36.5 | 1 | 0.97 | 97.00 | 0.97 | 1 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour. Gneissosity defined by garnet rich layers and alternate quartz feldspar layers. | 76.33 |
| 36.5 | 39.5 | 3 | 2.95 | 98.33 | 2.95 | 3 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where very minute graphite flakes are | 85.33 |

| Annexure -V: Summarised litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KTBH-1 | | | | | | | DATE OF COMMENCEMENT : 25.12.2024 | | | |
| LATITUDE - 19°20'18.8" | | | | | | | DATE OF COMPLETION: 02.01.2025 | | | |
| LONGITUDE - 83°36'45.4" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | | | in dessiminated form. Presence of muscovite & biotite rich layers (<2cm) | |
| 39.5 | 42.5 | 3 | 2.98 | 99.33 | 2.98 | 3 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where very minute graphite flakes are in dessiminated form. Presence of muscovite & biotite rich layers. | 85.67 |
| 42.5 | 45.5 | 3 | 2.98 | 99.33 | 2.98 | 3 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where very minute graphite flakes are in dessiminated form. Presence of muscovite & biotite rich layers. | 82.33 |
| 45.5 | 48.5 | 3 | 2.95 | 98.33 | 2.95 | 3 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where very minute graphite flakes are in dessiminated form. Presence of muscovite, biotite rich layers. | 89.67 |
| 48.5 | 51.5 | 3 | 2.98 | 99.33 | 2.98 | 3 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the dessiminated graphite flacks occur along the foliation plane. | 74.67 |
| 51.5 | 54.5 | 3 | 2.96 | 98.67 | 2.96 | 3 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the | |

| Annexure -V: Summarised litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-1 | | | | | | | DATE OF COMMENCEMENT : 25.12.2024 | | | |
| LATITUDE - 19°20'18.8" | | | | | | | DATE OF COMPLETION: 02.01.2025 | | | |
| LONGITUDE - 83°36'45.4" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | | | dessiminated graphite flacks occur along the foliation plane. | |
| 54.5 | 57.5 | 3 | 2.97 | 99.00 | 0.39 | 0.4 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the dessiminated graphite flacks occur along the foliation plane. | 58.85 |
| | | | | | 2.58 | 2.6 | Granite gneiss | HQ | Coarse grained, brownish white in colour, containing muscovite and opaque | 34.80 |
| 57.5 | 60.5 | 3 | 3 | 100.00 | 2.5 | 2.5 | Granite gneiss | HQ | Coarse grained, brownish white in colour, containing muscovite and opaque. Chalcopryrite/pyrite(?) present in this lithounits. | 52.00 |
| | | | | | 0.5 | 0.5 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 41.10 |
| 60.5 | 63.5 | 3 | 3 | 100.00 | 0.73 | 0.73 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | |
| | | | | | 0.24 | 0.24 | Garnetiferous quartzite | HQ | Medium grained colorless rock containing pinkish garnet (grossular) | 85.88 |
| | | | | | 0.85 | 0.85 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | |
| | | | | | 0.12 | 0.12 | Granite gneiss with | HQ | Medium to coarse grained | 97.22 |

| Annexure -V: Summarised litholog sheet of KKBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-1 | | | | | | | DATE OF COMMENCEMENT : 25.12.2024 | | | |
| LATITUDE - 19°20'18.8" | | | | | | | DATE OF COMPLETION: 02.01.2025 | | | |
| LONGITUDE - 83°36'45.4" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | CORE | | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | graphite | | brownish colored, containing biotite and graphite. | |
| | | | | | 0.36 | 0.36 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | |
| | | | | | 0.39 | 0.39 | Quartzite | HQ | Medium grained colorless rock containing pinkish garnet (grossular) | |
| | | | | | 0.07 | 0.07 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored rock, fragmented medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | |
| | | | | | 0.24 | 0.24 | Charnockite | HQ | Dark coloured greenish grained rock with quartz and feldspar. | 91.33 |
| 63.5 | 65 | 1.5 | 1.48 | | 1.48 | 1.5 | Charnockite | HQ | Dark coloured greenish grained rock with quartz and feldspar. | 98.66 |
| THE BOREHOLE WAS CLOSED AT 65m DEPTH IN QUARZITE ON 01.01.2025 | | | | | | | | | | |

| Annexure -VI: Summarised litholog sheet of KTBH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KTBH-2 | | | | | | | DATE OF COMMENCEMENT : 07.01.2025 | | | |
| LATITUDE - 19°20'22.1" | | | | | | | DATE OF COMPLETION: 12.01.2025 | | | |
| LONGITUDE - 83°36'42.0" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| 0 | 0.5 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Top Soil | HQ | Lateritic soil having reddish brown color. | 0 |
| 0.5 | 1 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Top Soil | HQ | Lateritic soil having reddish brown color. | 0 |
| 1 | 1.5 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Top Soil | HQ | Lateritic soil having reddish brown color. | 0 |
| 1.5 | 2 | 0.5 | 0.47 | 94 | 0.47 | 0.5 | Top Soil | HQ | Lateritic soil having reddish brown color. | 0 |
| 2 | 2.5 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Top Soil | HQ | Lateritic soil having reddish brown color. | 0 |
| 2.5 | 3 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Top Soil | HQ | Lateritic soil having reddish brown color. | 0 |
| 3 | 3.5 | 0.5 | 0.47 | 94 | 0.47 | 0.5 | Top Soil | HQ | Lateritic soil having reddish brown color. | 0 |
| 3.5 | 4 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Top Soil | HQ | Lateritic soil having reddish brown color. | 0 |
| 4 | 5 | 1 | 0.98 | 98 | 0.98 | 1 | Top Soil | HQ | Lateritic soil having reddish brown color. | 0 |
| 5 | 6 | 1 | 0.98 | 98 | 0.88 | 0.9 | Top Soil | HQ | Lateritic soil having reddish brown color. | 0 |
| | | | | | 0.1 | 0.1 | Weathered mantle | HQ | Reddish brown color | 0 |
| 6 | 7 | 1 | 0.96 | 96 | 0.96 | 1 | Weathered mantle | HQ | Reddish brown colored containing fragments of granite gneiss. | 0 |
| 7 | 8 | 1 | 0.95 | 95 | 0.95 | 1 | Weathered mantle | HQ | Reddish brown colored containing fragments of granite gneiss. | 0 |
| 8 | 9.5 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Weathered mantle | HQ | Brownish color | 0 |
| 9.5 | 12.5 | 3 | 3 | 100 | 3 | 3 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish | 30.67 |

| Annexure -VI: Summarised litholog sheet of KTBH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-2 | | | | | | | DATE OF COMMENCEMENT : 07.01.2025 | | | |
| LATITUDE - 19°20'22.1" | | | | | | | DATE OF COMPLETION: 12.01.2025 | | | |
| LONGITUDE - 83°36'42.0" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | | | coloured feldspar and quartz. | |
| 12.5 | 15.5 | 3 | 2.98 | 99.33 | 0.98 | 3 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 26.33 |
| 15.5 | 18.5 | 3 | 2.99 | 99.67 | 0.36 | 0.37 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 70.27 |
| | | | | | 2.63 | 2.63 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock | 67.68 |
| 18.5 | 21.5 | 3 | 3 | 100.00 | 3 | 3 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 80.67 |
| 21.5 | 24.5 | 3 | 3 | 100.00 | 3 | 3 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 94.00 |
| 24.5 | 27.5 | 3 | 3 | 100.00 | 3 | 3 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 85.00 |
| 27.5 | 30.5 | 3 | 3 | 100.00 | 3 | 3 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 65.00 |

| Annexure -VI: Summarised litholog sheet of KTBH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-2 | | | | | | | DATE OF COMMENCEMENT : 07.01.2025 | | | |
| LATITUDE - 19°20'22.1" | | | | | | | DATE OF COMPLETION: 12.01.2025 | | | |
| LONGITUDE - 83°36'42.0" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| 30.5 | 33.5 | 3 | 3 | 100.00 | 3 | 3 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 68.67 |
| 33.5 | 36.5 | 3 | 3 | 100.00 | 3 | 3 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 60.67 |
| 36.5 | 39.5 | 3 | 3 | 100.00 | 3 | 3 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 91.00 |
| 39.5 | 42.5 | 3 | 3 | 100.00 | 3 | 3 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 86.67 |
| 42.5 | 45.5 | 3 | 2.92 | 97.33 | 2.92 | 3 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 84.67 |
| 45.5 | 47 | 1.5 | 1.49 | 99.33 | 0.5 | 0.5 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock | 92.00 |
| | | | | | 0.99 | 1 | Leptynite | HQ | Whitish in color, coarse grained highly fractured rock containing blades of quartz. | 73.00 |
| 47 | 48.5 | 1.5 | 1.5 | 100.00 | 1.5 | 1.5 | Khondalite with graphite | HQ | Medium to coarse grained, | 97.33 |

| Annexure -VI: Summarised litholog sheet of KTBH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-2 | | | | | | | DATE OF COMMENCEMENT : 07.01.2025 | | | |
| LATITUDE - 19°20'22.1" | | | | | | | DATE OF COMPLETION: 12.01.2025 | | | |
| LONGITUDE - 83°36'42.0" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | | | | |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | |
| 48.5 | 51.5 | 3 | 2.98 | 99.33 | 0.57 | 0.57 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 96.49 |
| | | | | | 2.41 | 2.43 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock | 41.98 |
| 51.5 | 53 | 1.5 | 1.49 | 99.33 | 1.49 | 1.5 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 90 |
| 53 | 54.5 | 1.5 | 1.49 | 99.33 | 0.49 | 0.5 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 72 |
| | | | | | 1 | 1 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock | 67 |
| 54.5 | 56 | 1.5 | 1.47 | 98.00 | 1.13 | 1.16 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing fractured rock | 0 |
| | | | | | 0.34 | 0.34 | Graphite biotite gneiss | | Greyih white coloured rock where the gneisosity is defined by graphite and biotite rich layer alternate with quartz -feldspar | 0 |

| Annexure -VI: Summarised litholog sheet of KTBH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-2 | | | | | | | DATE OF COMMENCEMENT : 07.01.2025 | | | |
| LATITUDE - 19°20'22.1" | | | | | | | DATE OF COMPLETION: 12.01.2025 | | | |
| LONGITUDE - 83°36'42.0" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| 56 | 57.5 | 1.5 | 1.5 | 100.00 | 1.5 | 1.5 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing mica rich layer | 59.33 |
| 57.5 | 59 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing mica rich layer | 27.33 |
| 59 | 60.5 | 1.5 | 1.5 | 100.00 | 0.44 | 0.44 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 52.27 |
| | | | | | 1.06 | 1.06 | Quartz-feldspar-mica gneiss | HQ | Whitish grey in coloured, coarse grained rock where the gneissosity is defined by quartz-feldspar alternate with mica | 21.70 |
| 60.5 | 62 | 1.5 | 1.5 | 100.00 | 0.22 | 0.22 | Quartz-feldspar-mica gneiss | HQ | Whitish grey in coloured, coarse grained rock where the gneissosity is defined by quartz-feldspar alternate with mica | 0.00 |
| | | | | | 0.58 | 0.58 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock containing small graphite flakes along certain foliation plane | 46.55 |
| | | | | | 0.48 | 0.48 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock | 66.67 |
| | | | | | 0.22 | 0.22 | Khondalite with graphite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock | 0.00 |

| Annexure -VI: Summarised litholog sheet of KTBH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-2 | | | | | | | DATE OF COMMENCEMENT : 07.01.2025 | | | |
| LATITUDE - 19°20'22.1" | | | | | | | DATE OF COMPLETION: 12.01.2025 | | | |
| LONGITUDE - 83°36'42.0" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | | | containing small graphite flakes along certain foliation plane | |
| 62 | 63.5 | 1.5 | 1.49 | 99.33 | 1.49 | 1.5 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock | 66.67 |
| 63.5 | 65 | 1.5 | 1.49 | 99.33 | 0.09 | 0.1 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour, sillimanite bearing rock | 0.00 |
| | | | | | 1.4 | 1.4 | Graphite biotite gneiss | HQ | Greyish white coloured rock where the gneissosity is defined by graphite and biotite alternate with quartz -feldspar | 94.29 |
| 65 | 66.5 | 1.5 | 1.5 | 100.00 | 0.63 | 0.63 | Graphite biotite gneiss | HQ | Greyish white coloured rock where the gneissosity is defined by graphite and biotite alternate with quartz -feldspar | 55.56 |
| | | | | | 0.83 | 0.87 | Charnockite (?) | HQ | Dark greenish in colour, presence of slickenslide may be due to the faulting | |
| THE BOREHOLE WAS CLOSED AT 66.50 m DEPTH IN CHARNOKITE ON 12.01.2025 | | | | | | | | | | |

Annexure -VII: Summarised litholog sheet of KTBH-3 of Kanapulisi Block, Rayagada District, Odisha

| BOREHOLE NO. - KTBH-3 | | | | | | | DATE OF COMMENCEMENT : 02.01.2025 | | | |
|-------------------------|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| LATITUDE - 19°20'20.5" | | | | | | | DATE OF COMPLETION: 06.01.2025 | | | |
| LONGITUDE - 83°36'43.7" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| 0 | 0.5 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Top soil | HQ | Brownish yellow in colour | 0 |
| 0.5 | 1 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Top soil | HQ | Brownish yellow in colour | 0 |
| 1 | 1.5 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Top soil | HQ | Brownish yellow in colour | 0 |
| 1.5 | 2 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Top soil | HQ | Brownish yellow in colour | 0 |
| 2 | 2.5 | 0.5 | 0.47 | 94 | 0.47 | 0.5 | Weathered mantle | HQ | Brownish in colour with fragments of granite gneiss | 0 |
| 2.5 | 3 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Weathered mantle | HQ | Brownish in colour with fragments of granite gneiss | 0 |
| 3 | 3.5 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Weathered mantle | HQ | Yellowish in colour with fragments of granite gneiss | 0 |
| 3.5 | 4 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Weathered mantle | HQ | Yellowish in colour with fragments of granite gneiss | 0 |
| 4 | 5 | 1 | 0.92 | 92 | 0.92 | 1 | Sandy material | HQ | Brownish yellow in colour | 0 |
| 5 | 6 | 1 | 0.93 | 93 | 0.93 | 1 | Sandy material | HQ | Reddish in colour | 0 |
| 6 | 7 | 1 | 0.91 | 91 | 0.91 | 1 | Sandy material | HQ | Brownish yellow in colour | 0 |
| 7 | 8 | 1 | 0.94 | 94 | 0.94 | 1 | Sandy material | HQ | Brownish yellow in colour with fragments of granite gneiss | 0 |
| 8 | 9 | 1 | 0.94 | 94 | 0.94 | 1 | Sandy material | HQ | Brownish yellow in colour | 0 |
| 9 | 10 | 1 | 0.97 | 97 | 0.97 | 1 | Sandy material | HQ | Brownish yellow in colour | 0 |
| 10 | 11 | 1 | 0.96 | 96 | 0.96 | 1 | Sandy material | HQ | Brownish yellow in colour with fragments of granite gneiss | 0 |
| 11 | 12 | 1 | 0.97 | 97 | 0.97 | 1 | Sandy material | HQ | Yellowish in colour | 0 |
| 12 | 13 | 1 | 0.92 | 92 | 0.92 | 1 | Sandy material | HQ | Brownish yellow in colour with highly weathered granite gneiss | 0 |
| 13 | 14 | 1 | 0.94 | 94 | 0.94 | 1 | Sandy material | HQ | Brownish yellow in colour | 0 |
| 14 | 15 | 1 | 0.94 | 94 | 0.94 | 1 | Granite gneiss | HQ | Brownish white colored, coarse grained, highly weathered fragmented rock. | 0 |

| Annexure -VII: Summarised litholog sheet of KTBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-3 | | | | | | | DATE OF COMMENCEMENT : 02.01.2025 | | | |
| LATITUDE - 19°20'20.5" | | | | | | | DATE OF COMPLETION: 06.01.2025 | | | |
| LONGITUDE - 83°36'43.7" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| 15 | 16 | 1 | 0.95 | 95 | 0.95 | 1 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 0 |
| 16 | 19 | 3 | 2.78 | 92.67 | 0.32 | 0.52 | Muddy material | HQ | Brownish in colour with fragments of Khondalite | 0 |
| | | | | | 2.46 | 2.48 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour. Fractured at bottom | 40.73 |
| 19 | 22 | 3 | 2.98 | 99.33 | 1.3 | 1.32 | Leptynite | HQ | Whitish in color, coarse grained rock containing blades of quartz | 44.70 |
| | | | | | 1.68 | 1.68 | Khondalite | HQ | Medium to coarse grained, pinkish white colored rock | 82.74 |
| 22 | 25 | 3 | 2.98 | 99.33 | 2.67 | 2.68 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 77.24 |
| | | | | | 0.31 | 0.32 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 65.63 |
| 25 | 28 | 3 | 2.95 | 98.33 | 0.59 | 0.61 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 19.67 |
| | | | | | 0.33 | 0.34 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the disseminated graphite flakes occur along the foliation plane. | 94.12 |
| | | | | | 0.73 | 0.73 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 42.47 |

| Annexure -VII: Summarised litholog sheet of KTBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-3 | | | | | | | DATE OF COMMENCEMENT : 02.01.2025 | | | |
| LATITUDE - 19°20'20.5" | | | | | | | DATE OF COMPLETION: 06.01.2025 | | | |
| LONGITUDE - 83°36'43.7" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | 0.92 | 0.94 | Leptynite | HQ | Whitish in color, coarse grained highly fractured rock containing blades of quartz. 0.08cm biotite layers present. | 18.09 |
| | | | | | 0.38 | 0.38 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the disseminated graphite flakes occur along the foliation plane. 0.08cm quartz rich layer present. | 92.11 |
| 28 | 31 | 3 | 2.97 | 99.00 | 1.86 | 1.88 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the disseminated graphite flakes occur along the foliation plane. | 71.28 |
| | | | | | 0.34 | 0.35 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 31.43 |
| | | | | | 0.1 | 0.1 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the disseminated graphite flakes occur along the foliation plane. | 0.00 |
| | | | | | 0.67 | 0.67 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 76.12 |
| 31 | 34 | 3 | 2.76 | 92.00 | 2.6 | 2.79 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 80.65 |
| | | | | | 0.16 | 0.21 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite | 57.14 |

| Annexure -VII: Summarised litholog sheet of KTBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KTBH-3 | | | | | | | DATE OF COMMENCEMENT : 02.01.2025 | | | |
| LATITUDE - 19°20'20.5" | | | | | | | DATE OF COMPLETION: 06.01.2025 | | | |
| LONGITUDE - 83°36'43.7" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | | | bearing rock where the dessiminated graphite flakes occur along the foliation plane. | |
| 34 | 35.5 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 52.00 |
| 35.5 | 37 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour | 46.00 |
| 37 | 38.5 | 1.5 | 1.46 | 97.33 | 0.32 | 0.32 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the dessiminated graphite flakes occur along the foliation plane. | 87.50 |
| | | | | | 1.14 | 1.18 | Khondalite | HQ | Medium to coarse grained rock, pinkish white in colour | 87.29 |
| 38.5 | 40 | 1.5 | 1.49 | 99.33 | 1.49 | 1.5 | Khondalite | HQ | Medium to coarse grained rock, pinkish white in colour | 98.00 |
| 40 | 41.5 | 1.5 | 1.45 | 96.67 | 1.45 | 1.5 | Khondalite | HQ | Medium to coarse grained rock, pinkish white in colour | 53.33 |
| 41.5 | 43 | 1.5 | 1.44 | 96.00 | 0.98 | 1 | Khondalite | HQ | Medium to coarse grained rock, pinkish white in colour | 47 |
| | | | | | 0.46 | 0.5 | Khondalite with graphite | HQ | Reddish white colored rock, coarse grained sillimanite bearing rock where the dessiminated graphite flakes occur along the foliation plane. | 70 |

| Annexure -VII: Summarised litholog sheet of KTBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|--------|
| BOREHOLE NO. - KTBH-3 | | | | | | | DATE OF COMMENCEMENT : 02.01.2025 | | | |
| LATITUDE - 19°20'20.5" | | | | | | | DATE OF COMPLETION: 06.01.2025 | | | |
| LONGITUDE - 83°36'43.7" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| 43 | 44.5 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Khondalite with graphite | HQ | Reddish white colored rock, coarse grained sillimanite bearing rock where the dessiminated graphite flakes occur along the foliation plane. | 86 |
| 44.5 | 46 | 1.5 | 1.46 | 97.33 | 0.5 | 0.53 | Khondalite | HQ | Medium to coarse grained rock, pinkish white in colour | 60.38 |
| | | | | | 0.96 | 0.97 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the dessiminated graphite flakes occur along the foliation plane. | 115.46 |
| 46 | 47.5 | 1.5 | 1.46 | 97.33 | 0.6 | 0.62 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the dessiminated graphite flakes occur along the foliation plane. | 79.03 |
| | | | | | 0.86 | 0.88 | Khondalite | HQ | Medium to coarse grained rock, pinkish white in colour with the presence of quartz rich bands. | 19.32 |
| 47.5 | 49 | 1.5 | 1.46 | 97.33 | 1.46 | 1.5 | Khondalite | HQ | Medium to coarse grained rock, pinkish white in colour with the presence of quartz rich bands. | 68.00 |
| 49 | 50.5 | 1.5 | 1.47 | 98.00 | 1.47 | 1.5 | Khondalite | HQ | Medium to coarse grained rock, pinkish white in colour with the presence of | 64.00 |

| Annexure -VII: Summarised litholog sheet of KTBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KTBH-3 | | | | | | | DATE OF COMMENCEMENT : 02.01.2025 | | | |
| LATITUDE - 19°20'20.5" | | | | | | | DATE OF COMPLETION: 06.01.2025 | | | |
| LONGITUDE - 83°36'43.7" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | | | quartz rich bands and biotite rich layers. | |
| 50.5 | 52 | 1.5 | 1.48 | 98.67 | 0.66 | 0.66 | Khondalite | HQ | Medium to coarse grained rock, pinkish white in colour with the presence of quartz rich bands and biotite rich layers. | 24.24 |
| | | | | | 0.48 | 0.48 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored rock, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 66.67 |
| | | | | | 0.34 | 0.36 | Khondalite | HQ | Medium to coarse grained, pinkish white in colour with highly weathered rock with mica rich layers. Presence of a greenish colour mineral. | 0.00 |
| 52 | 53.5 | 1.5 | 1.49 | 99.33 | 1.04 | 1.05 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 36.19 |
| | | | | | 0.45 | 0.45 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the dessiminated graphite flakes occur along the foliation plane. | 0.00 |
| 53.5 | 55 | 1.5 | 1.49 | 99.33 | 1.24 | 1.25 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the dessiminated graphite flakes occur along the foliation | 0.00 |

| Annexure -VII: Summarised litholog sheet of KTBH-3 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|---|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KTBH-3 | | | | | | | DATE OF COMMENCEMENT : 02.01.2025 | | | |
| LATITUDE - 19°20'20.5" | | | | | | | DATE OF COMPLETION: 06.01.2025 | | | |
| LONGITUDE - 83°36'43.7" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | | | plane. | |
| | | | | | 0.25 | 0.25 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 0.00 |
| 55 | 56.5 | 1.5 | 1.5 | 100.00 | 1.2 | 1.2 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 75.00 |
| | | | | | 0.3 | 0.3 | Khondalite with graphite | HQ | Reddish white colored, coarse grained sillimanite bearing rock where the dessiminated graphite flakes occur along the foliation plane. Quartz-feldspathic graphite gneiss of 10cm length at bottom. | 76.67 |
| 56.5 | 58 | 1.5 | 1.5 | 100.00 | 0.1 | 0.1 | Quartzo-feldspathic graphite gneiss | HQ | Greyish colored, medium to coarse grained rock where graphite flakes are parallel to the plane of schistosity. | 0.00 |
| | | | | | 1.4 | 1.4 | Charnockite (?) | HQ | Dark greenish coloured medium grained rock with quartz and feldspar. | 66.43 |
| 58 | 60.2 | 2.2 | 2.1 | | 2.1 | 2.2 | Charnockite (?) | HQ | Dark greenish coloured medium grained rock with quartz and feldspar. | 54.09 |
| | | | | | | | | | | |
| THE BOREHOLE WAS CLOSED AT 60.20 m DEPTH IN CHARNOCKITE ON 06.01.2025 | | | | | | | | | | |

| Annexure -VIII: Summarised litholog sheet of KABH-1 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KABH-1 | | | | | | | DATE OF COMMENCEMENT : 14.01.2025 | | | |
| LATITUDE - 19°19'53.4" | | | | | | | DATE OF COMPLETION: 21.01.2025 | | | |
| LONGITUDE - 83°37'37.9" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | | CORE | | | | | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| 0 | 0.5 | 0.5 | 0.46 | 92 | 0.46 | 0.5 | Top Soil | HQ | Reddish brown in colour | 0 |
| 0.5 | 1 | 0.5 | 0.45 | 90 | 0.45 | 0.5 | Top Soil | HQ | Reddish brown in colour | 0 |
| 1 | 1.5 | 0.5 | 0.47 | 94 | 0.47 | 0.5 | Top Soil | HQ | Reddish brown in colour | 0 |
| 1.5 | 2 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Top Soil | HQ | Reddish brown in colour | 0 |
| 2 | 2.5 | 0.5 | 0.46 | 92 | 0.46 | 0.5 | Top Soil | HQ | Reddish brown in colour | 0 |
| 2.5 | 3 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Top Soil | HQ | Reddish brown in colour | 0 |
| 3 | 3.5 | 0.5 | 0.47 | 94 | 0.47 | 0.5 | Top Soil | HQ | Reddish brown in colour | 0 |
| 3.5 | 4 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Weathered mantle | HQ | Brownish in colour with fragments of granite gneiss | 0 |
| 4 | 4.5 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Weathered mantle | HQ | Brownish in colour with fragments of granite gneiss | 0 |
| 4.5 | 5 | 0.5 | 0.47 | 94 | 0.47 | 0.5 | Weathered mantle | HQ | Brownish in colour with fragments of granite gneiss | 0 |
| 5 | 5.5 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Weathered mantle | HQ | Brownish in colour with fragments of granite gneiss | 0 |
| 5.5 | 6 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Weathered mantle | HQ | Brownish in colour with fragments of granite gneiss | 0 |
| 6 | 7 | 1 | 0.96 | 96 | 0.96 | 1 | Weathered mantle | HQ | Brownish in colour with fragments of dark coloured fragments of charnockite | 0 |
| 7 | 8 | 1 | 0.97 | 97 | 0.97 | 1 | Charnockite | HQ | Dark coloured rock with quartz, feldspar and mafic mineral. | 41 |
| 8 | 9 | 1 | 0.85 | 85 | 0.2 | 0.25 | Charnockite | HQ | Dark coloured rock with quartz, feldspar and mafic mineral. | 0 |
| | | | | | 0.65 | 0.75 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 22.67 |
| 9 | 10 | 1 | 0.92 | 92 | 0.92 | 1 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 17.00 |
| 10 | 11 | 1 | 0.95 | 95 | 0.5 | 0.52 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 0.00 |
| | | | | | 0.45 | 0.48 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 0.00 |

| Annexure -VIII: Summarised litholog sheet of KABH-1 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|--------|
| BOREHOLE NO. - KABH-1 | | | | | | | DATE OF COMMENCEMENT : 14.01.2025 | | | |
| LATITUDE - 19°19'53.4" | | | | | | | DATE OF COMPLETION: 21.01.2025 | | | |
| LONGITUDE - 83°37'37.9" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | | CORE | | | | | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| 11 | 12.5 | 1.5 | 1.45 | 96.67 | 1.45 | 1.5 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 50.00 |
| 12.5 | 14 | 1.5 | 1.45 | 96.67 | 1.45 | 1.5 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 13.33 |
| 14 | 14.5 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 0.00 |
| 14.5 | 16 | 1.5 | 1.4 | 93.33 | 1.4 | 1.5 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 37.33 |
| 16 | 17.5 | 1.5 | 1.47 | 98.00 | 0.38 | 0.38 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 100.00 |
| | | | | | 0.43 | 0.44 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 31.82 |
| | | | | | 0.66 | 0.68 | Khondalite with graphite | HQ | Medium to coarse grained rock having tiny grains of pink garnet containing minor flakes of graphite | 83.82 |
| 17.5 | 19 | 1.5 | 1.46 | 97.33 | 1.46 | 1.5 | Khondalite with graphite | HQ | Medium to coarse grained rock having tiny grains of pink garnet containing minor flakes of graphite | 83.33 |
| 19 | 20.5 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 44.67 |
| 20.5 | 22 | 1.5 | 1.47 | 98.00 | 1.47 | 1.5 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 0.00 |
| 22 | 23.5 | 1.5 | 1.49 | 99.33 | 1.49 | 1.5 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 15.33 |
| 23.5 | 25 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 21.33 |
| 25 | 26.5 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 28.67 |
| 26.5 | 28 | 1.5 | 1.5 | 100.00 | 0.67 | 0.67 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 19.40 |
| | | | | | 0.83 | 0.83 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet. | 30.12 |

| Annexure -VIII: Summarised litholog sheet of KABH-1 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KABH-1 | | | | | | | DATE OF COMMENCEMENT : 14.01.2025 | | | |
| LATITUDE - 19°19'53.4" | | | | | | | DATE OF COMPLETION: 21.01.2025 | | | |
| LONGITUDE - 83°37'37.9" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | | CORE | | | | | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| 28 | 29.5 | 1.5 | 1.5 | 100.00 | 0.29 | 0.29 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet. | 89.66 |
| | | | | | 0.94 | 0.94 | Khondalite with graphite | HQ | Medium to coarse grained rock having tiny grains of pink garnet containing minor flakes of graphite | 0.00 |
| | | | | | 0.27 | 0.27 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet. | 55.56 |
| 29.5 | 30.5 | 1 | 1 | 100.00 | 0.98 | 1 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet. | 58.13 |
| 30.5 | 32 | 1.5 | 1.12 | 74.67 | 0.39 | 0.54 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet. | 53.70 |
| | | 0 | | | 0.73 | 0.96 | Khondalite with graphite | HQ | Medium to coarse grained rock having tiny grains of pink garnet containing minor flakes of graphite | 67.71 |
| 32 | 33.5 | 1.5 | 1.43 | 95.33 | 1.43 | 1.5 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet. | 72.67 |
| 33.5 | 35 | 1.5 | 1.46 | 97.33 | 1.46 | 1.5 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet and biotite | 67.33 |
| 35 | 36.5 | 1.5 | 1.4 | 93.33 | 1.4 | 1.5 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet and biotite | 48.67 |
| 36.5 | 38 | 1.5 | 1.44 | 96.00 | 1.44 | 1.5 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet and biotite | 52.00 |
| 38 | 39.5 | 1.5 | 1.47 | 98.00 | 1.47 | 1.5 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet and biotite | 70.00 |
| 39.5 | 41 | 1.5 | 1.47 | 98.00 | 1.47 | 1.5 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet and biotite | 0.00 |
| 41 | 42.5 | 1.5 | 1.47 | 98.00 | 1.47 | 1.5 | Khondalite | HQ | Medium to coarse grained fractured | 0.00 |

| Annexure -VIII: Summarised litholog sheet of KABH-1 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|--|-------|
| BOREHOLE NO. - KABH-1 | | | | | | | DATE OF COMMENCEMENT : 14.01.2025 | | | |
| LATITUDE - 19°19'53.4" | | | | | | | DATE OF COMPLETION: 21.01.2025 | | | |
| LONGITUDE - 83°37'37.9" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | | CORE | | | | | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | rock having tiny grains of pink garnet and biotite | |
| 42.5 | 44 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Khondalite | HQ | Medium to coarse grained fractured rock having tiny grains of pink garnet and biotite | 0.00 |
| 44 | 45.5 | 1.5 | 1.5 | 100.00 | 0.66 | 0.66 | Garnetiferous quartzite | HQ | Medium grained colorless rock containing pinkish garnet (grossular) | 42.42 |
| | | | | | 0.84 | 0.84 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 89.29 |
| 45.5 | 47 | 1.5 | 1.47 | 98.00 | 1.47 | 1.5 | Charnockite with thin bands of quartzite | HQ | Dark greenish coloured, medium grained rock | 73.33 |
| 47 | 48.5 | 1.5 | 1.44 | 96.00 | 1.44 | 1.5 | Garnetiferous quartzite | HQ | Medium grained colorless rock containing pinkish garnet (grossular) also containing thin bands of biotite | 31.33 |
| 48.5 | 50 | 1.5 | 1.41 | 94.00 | 1.41 | 1.5 | Garnetiferous quartzite | HQ | Medium grained colorless rock containing pinkish garnet (grossular) | 44.00 |
| 50 | 51 | 1 | 0.95 | 95.00 | 0.95 | 1 | Garnetiferous quartzite | HQ | Medium grained colorless rock containing pinkish garnet (grossular) also containing thin bands of biotite at top | 13.00 |
| 51 | 53 | 2 | 1.93 | 96.50 | 1.93 | 2 | Garnetiferous quartzite | HQ | Medium grained colorless rock containing pinkish garnet (grossular) | 53.50 |
| 53 | 54 | 1 | 0.94 | 94.00 | 0.94 | 1 | Khondalite | HQ | Medium to coarse grained sillimanite bearing rock having tiny grains of pink garnet | 78.00 |
| 54 | 55.5 | 1.5 | 1.45 | 96.67 | 1.45 | 1.5 | Khondalite | HQ | Medium to coarse grained sillimanite bearing rock having tiny grains of pink garnet | 52.00 |
| 55.5 | 57 | 1.5 | 1.46 | 97.33 | 1.46 | 1.5 | Khondalite | HQ | Medium to coarse grained sillimanite bearing rock having tiny grains of pink garnet | 66.00 |
| 57 | 58.5 | 1.5 | 1.5 | 100.00 | 1.5 | 1.5 | Khondalite | HQ | Medium to coarse grained sillimanite | 76.00 |

| Annexure -VIII: Summarised litholog sheet of KABH-1 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KABH-1 | | | | | | | DATE OF COMMENCEMENT : 14.01.2025 | | | |
| LATITUDE - 19°19'53.4" | | | | | | | DATE OF COMPLETION: 21.01.2025 | | | |
| LONGITUDE - 83°37'37.9" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | | CORE | | | | | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | | | bearing rock having tiny grains of pink garnet | |
| 58.5 | 60 | 1.32 | 1.5 | 113.64 | 0.22 | 0.27 | Khondalite | HQ | Medium to coarse grained sillimanite bearing rock having tiny grains of pink garnet | 44.44 |
| | | | | | 0.98 | 1.06 | Charnockite | HQ | Dark greenish coloured, medium grained rock containing biotite | 89.62 |
| | | | | | 0.12 | 0.17 | Khondalite | HQ | Medium to coarse grained sillimanite bearing rock having tiny grains of pink garnet | 70.59 |
| THE BOREHOLE WAS CLOSED AT 60 m DEPTH IN KHONDALITE ON 21.01.2025 | | | | | | | | | | |

| Annexure -IX: Summarised litholog sheet of KABH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KABH-2 | | | | | | | DATE OF COMMENCEMENT : 14.01.2025 | | | |
| LATITUDE - 19°19'51.8" | | | | | | | DATE OF COMPLETION: 21.01.2025 | | | |
| LONGITUDE - 83°37'40.9" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | | CORE | | | | | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| 0 | 0.5 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Top soil | HQ | Reddish brown in colour | 0 |
| 0.5 | 1 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Top soil | HQ | Reddish brown in colour | 0 |
| 1 | 1.5 | 0.5 | 0.49 | 98 | 0.49 | 0.5 | Top soil | HQ | Yellowish brown in colour | 0 |
| 1.5 | 2 | 0.5 | 0.48 | 96 | 0.48 | 0.5 | Top soil | HQ | Reddish brown in colour | 0 |
| 2 | 3 | 1 | 0.98 | 98 | 0.98 | 1 | Top soil | HQ | Reddish brown in colour | 0 |
| 3 | 4 | 1 | 0.96 | 96 | 0.43 | 0.45 | Top soil | HQ | Reddish brown in colour | 0 |
| | | | | | 0.53 | 0.55 | Weathered mantle | HQ | Yellowish brown in colour with fragments of granite gneiss. | 0 |
| 4 | 5 | 1 | 0.96 | 96 | 0.96 | 1 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 0 |
| 5 | 6 | 1 | 0.94 | 94 | 0.94 | 1 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 0 |
| 6 | 7.5 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 0 |
| 7.5 | 9 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 22.67 |
| 9 | 10.5 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 34.67 |
| 10.5 | 12 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 46.67 |
| 12 | 13.5 | 1.5 | 1.46 | 97.33 | 1.46 | 1.5 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 58.00 |
| 13.5 | 15 | 1.5 | 1.4 | 93.33 | 1.4 | 1.5 | Granite gneiss | HQ | Brownish white colored fractured rock where the gneissosity is defined by | 0.00 |

| Annexure -IX: Summarised litholog sheet of KABH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KABH-2 | | | | | | | DATE OF COMMENCEMENT : 14.01.2025 | | | |
| LATITUDE - 19°19'51.8" | | | | | | | DATE OF COMPLETION: 21.01.2025 | | | |
| LONGITUDE - 83°37'40.9" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | | | pinkish coloured feldspar and quartz. | |
| 15 | 16.5 | 1.5 | 1.38 | 92 | 0.73 | 0.8 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 57.50 |
| | | | | | 0.65 | 0.7 | Khondalite with graphite | HQ | Reddish white coloured rock where graphite flakes are oriented parallel to the foliation plane | 38.57 |
| 16.5 | 18 | 1.5 | 1.45 | 96.67 | 0.17 | 0.19 | Khondalite with graphite | HQ | Reddish white coloured rock where graphite flakes are oriented parallel to the foliation plane | 0.00 |
| | | | | | 0.5 | 0.51 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 0.00 |
| | | | | | 0.78 | 0.8 | Granite gneiss with graphite | HQ | Brownish white colored, coarse grained rock where the alternate layers of graphite present | 0.00 |
| 18 | 19.5 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Granite gneiss | HQ | Brownish white colored, coarse grained rock where the gneissosity is defined by pinkish coloured feldspar and quartz. | 47.33 |
| 19.5 | 21 | 1.5 | 1.34 | 89.33 | 1.34 | 1.5 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 0.00 |
| 21 | 22.5 | 1.5 | 1.5 | 100.00 | 0.96 | 0.96 | Khondalite with graphite | HQ | Reddish white coloured rock where graphite flakes are oriented parallel to the foliation plane | 47.92 |
| | | | | | 0.54 | 0.54 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 31.48 |
| 22.5 | 24 | 1.5 | 1.49 | 99.33 | 1.49 | 1.5 | Khondalite with graphite | HQ | Reddish white coloured rock where graphite flakes are oriented parallel to the foliation plane | 42.67 |
| 24 | 25.5 | 1.5 | 1.49 | 99.33 | 1.49 | 1.5 | Khondalite with graphite | HQ | Reddish white coloured rock where graphite flakes are oriented parallel to the foliation plane | 72.67 |
| 25.5 | 27 | 1.5 | 1.47 | 98.00 | 0.67 | 0.68 | Khondalite with | HQ | Reddish white coloured rock where | 39.71 |

| Annexure -IX: Summarised litholog sheet of KABH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KABH-2 | | | | | | | DATE OF COMMENCEMENT : 14.01.2025 | | | |
| LATITUDE - 19°19'51.8" | | | | | | | DATE OF COMPLETION: 21.01.2025 | | | |
| LONGITUDE - 83°37'40.9" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | | CORE | | | | | | | |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| | | | | | | | graphite | | graphite flakes are oriented parallel to the foliation plane | |
| | | | | | 0.44 | 0.45 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 97.78 |
| | | | | | 0.36 | 0.37 | Khondalite with graphite | HQ | Reddish white coloured rock where graphite flakes are oriented parallel to the foliation plane | 89.19 |
| 27 | 28.5 | 1.5 | 1.5 | 100.00 | 1.1 | 1.1 | Khondalite with graphite | HQ | Reddish white coloured rock where graphite flakes are oriented parallel to the foliation plane | 32.73 |
| | | | | | 0.4 | 0.4 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 0.00 |
| 28.5 | 30 | 1.5 | 1.35 | 90.00 | 0.34 | 0.39 | Khondalite with graphite | HQ | Reddish white coloured rock where graphite flakes are oriented parallel to the foliation plane | 0.00 |
| | | | | | 1.01 | 1.11 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet and containing mica rich layers. | 27.93 |
| 30 | 31.5 | 1.5 | 1.5 | 100.00 | 0.3 | 0.3 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 0.00 |
| | | | | | 1.2 | 1.2 | Biotite gneiss | HQ | Greyish white coloured rock where the gneissosity is defined by biotite rich layers alternate with quartz -feldspar rich layer. | 48.33 |
| 31.5 | 33 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Biotite gneiss | HQ | Greyish white coloured rock where the gneissosity is defined by biotite rich layers alternate with quartz -feldspar rich layer. | 22.00 |
| 33 | 34.5 | 1.5 | 1.5 | 100.00 | 0.76 | 0.76 | Biotite gneiss | HQ | Greyish white coloured rock where the gneissosity is defined by biotite rich layers alternate with quartz -feldspar rich layer. | 0.00 |
| | | | | | 0.74 | 0.74 | Quartzo-feldspathic | HQ | Grayish white coloured rock where the gneissosity is defined by graphite rich | 75.68 |

| Annexure -IX: Summarised litholog sheet of KABH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KABH-2 | | | | | | | DATE OF COMMENCEMENT : 14.01.2025 | | | |
| LATITUDE - 19°19'51.8" | | | | | | | DATE OF COMPLETION: 21.01.2025 | | | |
| LONGITUDE - 83°37'40.9" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | graphite gneiss | | layer alternate with quartz feldspar rich layer | |
| 34.5 | 36 | 1.5 | 1.5 | 100.00 | 1.5 | 1.5 | Quartzo-feldspathic graphite gneiss | HQ | Grayish white coloured rock where the gneissosity is defined by graphite rich layer alternate with quartz feldspar rich layer | 74.67 |
| 36 | 37.5 | 1.5 | 1.47 | 98.00 | 1.47 | 1.5 | Quartzo-feldspathic graphite gneiss | HQ | Grayish white coloured rock where the gneissosity is defined by graphite rich layer alternate with quartz feldspar rich layer | 72.67 |
| 37.5 | 39 | 1.5 | 1.48 | 98.67 | 0.59 | 0.6 | Quartzo-feldspathic graphite gneiss | HQ | Grayish white coloured rock where the gneissosity is defined by graphite rich layer alternate with quartz feldspar rich layer | 96.67 |
| | | | | | 0.89 | 0.9 | Garnetiferous quartzite | HQ | coarse grained, colourless rock containing larger crystals of garnet. | 65.56 |
| 39 | 40.5 | 1.5 | 1.5 | 100.00 | 0.6 | 0.6 | Garnetiferous quartzite | HQ | coarse grained, colourless rock containing larger crystals of garnet. | 60.00 |
| | | | | | 0.5 | 0.5 | Quartzo-feldspathic graphite gneiss | HQ | Grayish white coloured rock where the gneissosity is defined by graphite rich layer alternate with quartz feldspar rich layer | 58.00 |
| | | | | | 0.4 | 0.4 | Quartz feldspar garnet biotite gneiss | HQ | Gneissosity is well defined by alternate layers of quartz, feldspar, garnet and biotite. | 67.50 |
| 40.5 | 42 | 1.5 | 1.49 | 99.33 | 0.36 | 0.36 | Garnetiferous quartzite | HQ | coarse grained, colourless rock containing larger crystals of garnet with biotite rich layers within it. | 83.33 |
| | | | | | 1.13 | 1.14 | Quartzo-feldspathic graphite gneiss | HQ | Grayish white coloured rock where the gneissosity is defined by graphite rich layer alternate with quartz feldspar rich | 92.11 |

| Annexure -IX: Summarised litholog sheet of KABH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------|----------------------|-------------------------|-------------------------|----------------------------------|----------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KABH-2 | | | | | | | DATE OF COMMENCEMENT : 14.01.2025 | | | |
| LATITUDE - 19°19'51.8" | | | | | | | DATE OF COMPLETION: 21.01.2025 | | | |
| LONGITUDE - 83°37'40.9" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | TOTAL RUN LENGTH (m) | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO-UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | | | layer | |
| 42 | 43.5 | 1.5 | 1.47 | 98.00 | 1.04 | 1.06 | Garnetiferous quartzite | HQ | Coarse grained, colourless rock containing larger crystals of garnet. | 70.75 |
| | | | | | 0.43 | 0.44 | Quartzo-feldspathic graphite gneiss | HQ | Grayish white coloured rock where the gneissosity is defined by graphite rich layer alternate with quartz feldspar rich layer | 84.09 |
| 43.5 | 45 | 1.5 | 1.45 | 96.67 | 0.33 | 0.36 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 61.11 |
| | | | | | 1.12 | 1.14 | Khondalite with graphite | HQ | Reddish white coloured rock where graphite flakes are oriented parallel to the foliation plane | 78.95 |
| 45 | 46.5 | 1.5 | 1.46 | 97.33 | 1.46 | 1.5 | Khondalite with graphite | HQ | Reddish white coloured rock where graphite flakes are oriented parallel to the foliation plane | 75.33 |
| 46.5 | 48 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet with the occurrence of thin layers of graphite rich band within it. | 65.33 |
| 48 | 49.5 | 1.5 | 1.5 | 100.00 | 0.53 | 0.53 | Quartzite | HQ | Coarse grained colourless rock composed of quartz | 37.74 |
| | | | | | 0.97 | 0.97 | Quartzo-feldspathic graphite gneiss | HQ | Grayish white coloured rock where the gneissosity is defined by graphite rich layer alternate with quartz feldspar rich layer | 78.35 |
| 49.5 | 51 | 1.5 | 1.49 | 99.33 | 1.49 | 1.5 | Quartzo-feldspathic graphite gneiss | HQ | Grayish white coloured rock where the gneissosity is defined by graphite rich layer alternate with quartz feldspar rich layer | 74.00 |
| 51 | 52.5 | 1.5 | 1.45 | 96.67 | 1.45 | 1.5 | Quartzo-feldspathic | HQ | Grayish white coloured rock where the gneissosity is defined by graphite rich | 87.33 |

| Annexure -IX: Summarised litholog sheet of KABH-2 of Kanapulisi Block, Rayagada District, Odisha | | | | | | | | | | |
|--|--------------------|-------------------------------|----------------------------------|-------------------------------|---|----------------------------------|--|-----------|---|-------|
| BOREHOLE NO. - KABH-2 | | | | | | | DATE OF COMMENCEMENT : 14.01.2025 | | | |
| LATITUDE - 19°19'51.8" | | | | | | | DATE OF COMPLETION: 21.01.2025 | | | |
| LONGITUDE - 83°37'40.9" | | | | | | | WATER LEVEL AT THE TIME OF COMPLETION: | | | |
| RUN | | TOTAL RUN LENGTH (m) | CORE | | | | LITHOLOGY | CORE SIZE | DESCRIPTION | RQD % |
| DEPTH FROM (m) | DEPTH TO (m) | | TOTAL CORE RECOVERY (m) | RECOVERY PERCENTAGE (%) | CORE RECOVERY OF LITHO- UNITS (m) | EXTRAPOLATED THICKNESS (m) | | | | |
| | | | | | | | graphite gneiss | | layer alternate with quartz feldspar rich layer | |
| 52.5 | 54 | 1.5 | 1.49 | 99.33 | 0.72 | 0.73 | Quartzo-feldspathic graphite gneiss | HQ | Grayish white coloured rock where the gneissosity is defined by graphite rich layer alternate with quartz feldspar rich layer | 60.27 |
| | | | | | 0.77 | 0.77 | Garnetiferous quartzite | HQ | coarse grained, colourless rock containing larger crystals of garnet with a 16cm biotite rich layer within it. | 66.23 |
| 54 | 55.5 | 1.5 | 1.49 | 99.33 | 1.49 | 1.5 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 81.33 |
| 55.5 | 57 | 1.5 | 1.48 | 98.67 | 1.48 | 1.5 | Garnetiferous quartzite | HQ | coarse grained, colourless rock containing larger crystals of garnet. | 62.67 |
| 57 | 58.5 | 1.5 | 1.4 | 93.33 | 0.55 | 0.6 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 0.00 |
| | | | | | 0.85 | 0.9 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 42.22 |
| 58.5 | 60 | 1.5 | 1.5 | | 0.7 | 0.7 | Charnockite | HQ | Dark greenish coloured, medium grained rock | 22.86 |
| | | | | | 0.8 | 0.8 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 81.25 |
| 60 | 61.5 | 1.5 | 1.4 | | 1.4 | 1.5 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 35.33 |
| 61.5 | 63 | 1.5 | 1.5 | | 1.5 | 1.5 | Khondalite | HQ | Medium to coarse grained rock having tiny grains of pink garnet. | 66.67 |
| 63 | 64.5 | 1.5 | 1.49 | | 1.49 | 1.5 | Garnetiferous quartzite | HQ | medium grained colorless rock containing pinkish garnet (grossular) | 56.00 |
| 64.5 | 65.8 | 1.3 | 1.3 | | 1.3 | 1.3 | Quartzite | HQ | medium grained colorless rock containing pinkish garnet. | 75.38 |
| THE BOREHOLE WAS CLOSED AT 65.80 M DEPTH ON 24.01.2024 IN QUARTZITE | | | | | | | | | | |

| Annexure X Analytical report of proximate analysis for core samples | | | | | | |
|---|---------------|--------------|--------|---------|-------|--------|
| SL NO | SAMPLE NUMBER | MOISTURE (%) | VM (%) | ASH (%) | S (%) | FC (%) |
| 1 | KKBH-1/S-1 | 1.11 | 2.53 | 97.16 | 0.09 | 0.22 |
| 2 | KKBH-1/S-2 | 0.81 | 3.29 | 96.48 | 0.10 | 0.13 |
| 3 | KKBH-1/S-3 | 1.84 | 5.49 | 91.60 | 0.11 | 2.81 |
| 4 | KKBH-1/S-4 | 1.04 | 3.32 | 92.13 | 0.16 | 4.39 |
| 5 | KKBH-1/S-5 | 0.61 | 2.38 | 91.32 | 0.18 | 6.11 |
| 6 | KKBH-1/S-6 | 1.09 | 4.74 | 94.88 | 0.15 | 0.23 |
| 7 | KKBH-1/S-7 | 0.98 | 4.02 | 94.65 | 0.16 | 1.16 |
| 8 | KKBH-1/S-8 | 1.23 | 2.47 | 92.91 | 0.17 | 4.45 |
| 9 | KKBH-1/S-9 | 1.23 | 3.71 | 96.02 | 0.11 | 0.16 |
| 10 | KKBH-1/S-10 | 1.11 | 4.72 | 92.91 | 0.11 | 2.26 |
| 11 | KKBH-1/S-11 | 1.21 | 4.51 | 93.57 | 0.12 | 1.80 |
| 12 | KKBH-1/S-12 | 0.43 | 1.28 | 98.36 | 0.09 | 0.27 |
| 13 | KKBH-1/S-13 | 1.22 | 3.72 | 94.31 | 0.14 | 1.83 |
| 14 | KKBH-1/S-14 | 1.26 | 3.84 | 95.68 | 0.14 | 0.34 |
| 15 | KKBH-1/S-15 | 0.95 | 4.76 | 95.11 | 0.13 | 0.00 |
| 16 | KKBH-1/S-16 | 1.59 | 3.31 | 96.42 | 0.12 | 0.15 |
| 17 | KKBH-1/S-17 | 2.92 | 4.88 | 94.71 | 0.08 | 0.33 |
| 18 | KKBH-1/S-18 | 2.21 | 5.07 | 94.53 | 0.15 | 0.25 |
| 19 | KKBH-1/S-19 | 2.02 | 4.14 | 93.44 | 0.19 | 2.24 |
| 20 | KKBH-1/S-20 | 1.30 | 4.86 | 94.48 | 0.11 | 0.55 |
| 21 | KKBH-1/S-21 | 2.25 | 6.04 | 92.66 | 0.09 | 1.21 |
| 22 | KKBH-1/S-22 | 1.56 | 5.26 | 90.81 | 0.08 | 3.85 |
| 23 | KKBH-1/S-23 | 1.32 | 5.14 | 92.01 | 0.13 | 2.71 |
| 24 | KKBH-1/S-24 | 1.20 | 5.37 | 90.57 | 0.12 | 3.94 |
| 25 | KKBH-1/S-25 | 1.81 | 5.64 | 92.62 | 0.18 | 1.56 |
| 26 | KKBH-1/S-26 | 1.36 | 4.65 | 93.01 | 0.17 | 2.17 |
| 27 | KKBH-1/S-27 | 1.17 | 4.81 | 91.60 | 0.17 | 3.42 |
| 28 | KKBH-1/S-28 | 1.01 | 4.42 | 94.21 | 0.16 | 1.21 |
| 29 | KKBH-1/S-29 | 1.09 | 4.85 | 93.76 | 0.14 | 1.25 |
| 30 | KKBH-1/S-30 | 0.95 | 4.25 | 94.77 | 0.15 | 0.83 |
| 31 | KKBH-2/S-01 | 1.57 | 2.85 | 92.74 | 0.13 | 4.28 |
| 32 | KKBH-2/S-02 | 2.10 | 3.39 | 94.07 | 0.12 | 2.42 |
| 33 | KKBH-2/S-03 | 2.52 | 4.62 | 93.19 | 0.08 | 2.12 |

Annexure X Analytical report of proximate analysis for core samples

| SL NO | SAMPLE NUMBER | MOISTURE (%) | VM (%) | ASH (%) | S (%) | FC (%) |
|-------|---------------|--------------|--------|---------|-------|--------|
| 34 | KKBH-2/S-04 | 4.05 | 5.20 | 94.48 | 0.15 | 0.17 |
| 35 | KKBH-2/S-05 | 2.29 | 4.38 | 94.81 | 0.19 | 0.62 |
| 36 | KKBH-2/S-06 | 1.46 | 4.28 | 93.13 | 0.11 | 2.48 |
| 37 | KKBH-2/S-07 | 1.51 | 3.39 | 96.40 | 0.09 | 0.12 |
| 38 | KKBH-2/S-08 | 1.57 | 2.28 | 93.22 | 0.08 | 4.42 |
| 39 | KKBH-2/S-09 | 1.41 | 3.54 | 93.91 | 0.13 | 2.42 |
| 40 | KKBH-2/S-10 | 1.20 | 3.86 | 93.08 | 0.12 | 2.94 |
| 41 | KKBH-2/S-11 | 1.24 | 3.22 | 92.10 | 0.14 | 4.55 |
| 42 | KKBH-2/S-12 | 1.37 | 4.34 | 91.81 | 0.15 | 3.70 |
| 43 | KKBH-2/S-13 | 1.25 | 4.25 | 94.85 | 0.16 | 0.74 |
| 44 | KKBH-2/S-14 | 1.41 | 3.89 | 89.55 | 0.17 | 6.39 |
| 45 | KKBH-2/S-15 | 1.02 | 2.83 | 96.88 | 0.11 | 0.18 |
| 46 | KKBH-2/S-16 | 0.97 | 3.07 | 96.64 | 0.13 | 0.16 |
| 47 | KKBH-2/S-17 | 0.79 | 3.00 | 96.72 | 0.12 | 0.16 |
| 48 | KKBH-2/S-18 | 0.90 | 2.59 | 97.07 | 0.14 | 0.20 |
| 49 | KKBH-2/S-19 | 1.21 | 2.68 | 95.93 | 0.16 | 1.24 |
| 50 | KKBH-2/S-20 | 0.52 | 1.53 | 98.27 | 0.09 | 0.11 |
| 51 | KKBH-2/S-21 | 1.18 | 2.81 | 96.14 | 0.11 | 0.93 |
| 52 | KKBH-2/S-22 | 1.24 | 2.19 | 97.60 | 0.10 | 0.11 |
| 53 | KKBH-2/S-23 | 1.89 | 3.98 | 94.58 | 0.13 | 1.30 |
| 54 | KKBH-2/S-24 | 1.36 | 1.28 | 98.46 | 0.12 | 0.14 |
| 55 | KKBH-2/S-25 | 2.14 | 4.16 | 94.11 | 0.16 | 1.57 |
| 56 | KKBH-2/S-26 | 1.14 | 2.76 | 95.75 | 0.13 | 1.36 |
| 57 | KKBH-3/S-01 | 1.29 | 3.94 | 90.15 | 0.17 | 5.74 |
| 58 | KKBH-3/S-02 | 1.06 | 2.92 | 87.67 | 0.18 | 9.24 |
| 59 | KKBH-3/S-03 | 1.74 | 4.10 | 94.65 | 0.16 | 1.09 |
| 60 | KKBH-3/S-04 | 1.28 | 4.10 | 90.46 | 0.19 | 5.25 |
| 61 | KKBH-3/S-05 | 1.33 | 4.32 | 92.44 | 0.17 | 3.07 |
| 62 | KKBH-3/S-06 | 1.02 | 3.11 | 91.95 | 0.16 | 4.79 |
| 63 | KKBH-3/S-07 | 0.97 | 3.33 | 93.52 | 0.14 | 3.01 |
| 64 | KKBH-3/S-08 | 1.24 | 3.60 | 94.38 | 0.13 | 1.89 |
| 65 | KKBH-3/S-09 | 0.68 | 2.65 | 96.65 | 0.11 | 0.59 |
| 66 | KKBH-3/S-10 | 1.42 | 3.21 | 93.70 | 0.09 | 3.00 |
| 67 | KTBH-1/S01 | 0.68 | 1.00 | 98.23 | 0.10 | 0.67 |
| 68 | KTBH-1/S02 | 0.16 | 0.43 | 99.30 | 0.05 | 0.22 |

Annexure X Analytical report of proximate analysis for core samples

| SL NO | SAMPLE NUMBER | MOISTURE (%) | VM (%) | ASH (%) | S (%) | FC (%) |
|-------|---------------|--------------|--------|---------|-------|--------|
| 69 | KTBH-1/S03 | 0.19 | 0.39 | 99.42 | 0.04 | 0.15 |
| 70 | KTBH-1/S04 | 0.18 | 0.34 | 99.18 | 0.08 | 0.40 |
| 71 | KTBH-1/S05 | 0.42 | 0.24 | 99.62 | 0.04 | 0.10 |
| 72 | KTBH-1/S06 | 0.17 | 0.36 | 99.36 | 0.14 | 0.14 |
| 73 | KTBH-1/S07 | 0.27 | 0.28 | 99.62 | 0.06 | 0.04 |
| 74 | KTBH-1/S08 | 0.13 | 0.36 | 99.28 | 0.07 | 0.29 |
| 75 | KTBH-1/S09 | 0.16 | 0.34 | 99.21 | 0.08 | 0.37 |
| 76 | KTBH-1/S10 | 0.16 | 0.29 | 99.49 | 0.04 | 0.18 |
| 77 | KTBH-1/S11 | 0.19 | 0.31 | 99.58 | 0.06 | 0.05 |
| 78 | KTBH-1/S12 | 0.17 | 0.35 | 99.18 | 0.07 | 0.40 |
| 79 | KTBH-1/S13 | 0.18 | 0.33 | 99.53 | 0.04 | 0.10 |
| 80 | KTBH-1/S14 | 0.32 | 0.27 | 99.30 | 0.05 | 0.38 |
| 81 | KTBH-1/S15 | 0.15 | 0.22 | 99.55 | 0.04 | 0.19 |
| 82 | KTBH-1/S16 | 0.15 | 0.26 | 99.60 | 0.06 | 0.08 |
| 83 | KTBH-1/S17 | 0.23 | 0.61 | 99.13 | 0.06 | 0.20 |
| 84 | KTBH-1/S18 | 0.31 | 0.75 | 98.90 | 0.03 | 0.32 |
| 85 | KTBH-1/S19 | 0.17 | 0.64 | 99.10 | 0.07 | 0.19 |
| 86 | KTBH-1/S20 | 1.68 | 3.47 | 90.03 | 0.16 | 6.34 |
| 87 | KTBH-1/S21 | 1.33 | 3.78 | 92.64 | 0.11 | 3.48 |
| 88 | KTBH-1/S22 | 1.27 | 2.53 | 88.84 | 0.10 | 8.53 |
| 89 | KTBH-2/S-01 | 0.35 | 0.38 | 99.27 | 0.06 | 0.29 |
| 90 | KTBH-2/S-02 | 0.27 | 0.35 | 99.35 | 0.04 | 0.26 |
| 91 | KTBH-2/S-03 | 0.26 | 0.34 | 99.17 | 0.05 | 0.44 |
| 92 | KTBH-2/S-04 | 0.26 | 0.37 | 99.11 | 0.06 | 0.46 |
| 93 | KTBH-2/S-05 | 0.25 | 0.35 | 99.24 | 0.03 | 0.38 |
| 94 | KTBH-2/S-06 | 0.29 | 0.34 | 99.17 | 0.04 | 0.45 |
| 95 | KTBH-2/S-07 | 0.31 | 0.38 | 99.25 | 0.07 | 0.30 |
| 96 | KTBH-2/S-08 | 0.27 | 0.54 | 99.03 | 0.07 | 0.36 |
| 97 | KTBH-2/S-09 | 0.25 | 0.45 | 99.24 | 0.05 | 0.26 |
| 98 | KTBH-2/S-10 | 0.30 | 0.43 | 99.18 | 0.03 | 0.36 |
| 99 | KTBH-2/S-11 | 0.39 | 0.39 | 98.99 | 0.05 | 0.57 |
| 100 | KTBH-2/S-12 | 0.75 | 0.70 | 99.09 | 0.06 | 0.15 |
| 101 | KTBH-2/S-13 | 0.35 | 0.36 | 99.25 | 0.09 | 0.30 |
| 102 | KTBH-2/S-14 | 0.42 | 0.60 | 99.07 | 0.13 | 0.20 |
| 103 | KTBH-2/S-15 | 1.30 | 0.88 | 98.39 | 0.06 | 0.67 |

Annexure X Analytical report of proximate analysis for core samples

| SL NO | SAMPLE NUMBER | MOISTURE (%) | VM (%) | ASH (%) | S (%) | FC (%) |
|-------|---------------|--------------|--------|---------|-------|--------|
| 104 | KTBH-2/S-16 | 1.05 | 0.87 | 98.39 | 0.07 | 0.67 |
| 105 | KTBH-2/S-17 | 0.36 | 0.27 | 99.31 | 0.06 | 0.36 |
| 106 | KTBH-2/S-18 | 0.24 | 0.42 | 99.29 | 0.06 | 0.23 |
| 107 | KTBH-2/S-19 | 0.18 | 0.30 | 99.53 | 0.04 | 0.13 |
| 108 | KTBH-2/S-20 | 0.28 | 0.42 | 99.23 | 0.05 | 0.30 |
| 109 | KTBH-2/S-21 | 0.29 | 0.60 | 99.14 | 0.03 | 0.23 |
| 110 | KTBH-2/S-22 | 0.27 | 1.00 | 94.59 | 0.14 | 4.26 |
| 111 | KTBH-2/S-23 | 0.23 | 0.51 | 98.73 | 0.09 | 0.67 |
| 112 | KTBH-2/S-24 | 0.27 | 0.21 | 99.27 | 0.08 | 0.44 |
| 113 | KTBH-2/S-25 | 0.31 | 0.28 | 99.51 | 0.05 | 0.16 |
| 114 | KTBH-2/S-26 | 0.32 | 0.37 | 99.27 | 0.06 | 0.30 |
| 115 | KTBH-2/S-27 | 0.31 | 0.40 | 99.31 | 0.04 | 0.25 |
| 116 | KTBH-2/S-28 | 0.30 | 0.17 | 99.50 | 0.06 | 0.27 |
| 117 | KTBH-2/S-29 | 0.29 | 0.46 | 99.20 | 0.04 | 0.30 |
| 118 | KTBH-2/S-30 | 0.32 | 0.30 | 99.07 | 0.06 | 0.57 |
| 119 | KTBH-2/S-31 | 0.24 | 0.28 | 99.39 | 0.09 | 0.24 |
| 120 | KTBH-2/S-32 | 0.30 | 0.21 | 99.50 | 0.07 | 0.22 |
| 121 | KTBH-2/S-33 | 0.31 | 0.35 | 99.11 | 0.04 | 0.50 |
| 122 | KTBH-2/S-34 | 0.57 | 1.03 | 98.44 | 0.09 | 0.44 |
| 123 | KTBH-2/S-35 | 0.56 | 1.42 | 97.65 | 0.09 | 0.84 |
| 124 | KTBH-2/S-36 | 1.38 | 3.14 | 94.25 | 0.13 | 2.48 |
| 125 | KTBH-2/S-37 | 0.94 | 2.49 | 91.84 | 0.16 | 5.51 |
| 126 | KTBH-2/S-38 | 1.04 | 4.04 | 90.32 | 0.14 | 5.50 |
| 127 | KTBH-3/S-01 | 0.22 | 0.81 | 98.86 | 0.04 | 0.29 |
| 128 | KTBH-3/S-02 | 0.04 | 0.73 | 98.80 | 0.06 | 0.41 |
| 129 | KTBH-3/S-03 | 0.02 | 0.70 | 98.90 | 0.05 | 0.35 |
| 130 | KTBH-3/S-04 | 0.04 | 0.61 | 98.97 | 0.04 | 0.38 |
| 131 | KTBH-3/S-05 | 0.18 | 0.87 | 98.72 | 0.08 | 0.33 |
| 132 | KTBH-3/S-06 | 0.02 | 0.80 | 98.76 | 0.08 | 0.36 |
| 133 | KTBH-3/S-07 | 0.22 | 0.56 | 99.15 | 0.04 | 0.25 |
| 134 | KTBH-3/S-08 | 0.04 | 0.73 | 98.89 | 0.07 | 0.31 |
| 135 | KTBH-3/S-09 | 0.48 | 0.63 | 99.07 | 0.06 | 0.24 |
| 136 | KTBH-3/S-10 | 1.64 | 2.23 | 97.22 | 0.11 | 0.44 |
| 137 | KTBH-3/S-11 | 0.66 | 2.52 | 94.84 | 0.14 | 2.50 |
| 138 | KTBH-3/S-12 | 1.38 | 3.11 | 93.65 | 0.10 | 3.14 |

Annexure X Analytical report of proximate analysis for core samples

| SL NO | SAMPLE NUMBER | MOISTURE (%) | VM (%) | ASH (%) | S (%) | FC (%) |
|-------|---------------|--------------|--------|---------|-------|--------|
| 139 | KTBH-3/S-13 | 2.39 | 4.91 | 91.06 | 0.15 | 3.88 |
| 140 | KTBH-3/S-14 | 1.96 | 4.37 | 89.59 | 0.16 | 5.87 |
| 141 | KTBH-3/S-15 | 0.70 | 2.45 | 95.01 | 0.09 | 2.45 |
| 142 | KABH-1/S-1 | 0.57 | 0.61 | 98.93 | 0.04 | 0.42 |
| 143 | KABH-1/S-2 | 0.98 | 2.31 | 96.57 | 0.09 | 1.03 |
| 144 | KABH-1/S-3 | 0.24 | 0.64 | 99.02 | 0.04 | 0.30 |
| 145 | KABH-1/S-4 | 0.32 | 0.70 | 99.04 | 0.06 | 0.20 |
| 146 | KABH-2/S-1 | 0.98 | 1.39 | 98.04 | 0.07 | 0.50 |
| 147 | KABH-2/S-2 | 0.70 | 3.22 | 96.07 | 0.11 | 0.60 |
| 148 | KABH-2/S-3 | 1.01 | 2.05 | 97.34 | 0.08 | 0.53 |
| 149 | KABH-2/S-4 | 1.52 | 4.45 | 94.55 | 0.11 | 0.89 |
| 150 | KABH-2/S-5 | 1.40 | 4.63 | 94.38 | 0.16 | 0.83 |
| 151 | KABH-2/S-6 | 1.31 | 4.62 | 94.13 | 0.14 | 1.11 |
| 152 | KABH-2/S-7 | 1.12 | 3.13 | 96.00 | 0.12 | 0.75 |
| 153 | KABH-2/S-8 | 1.40 | 4.17 | 95.02 | 0.15 | 0.66 |
| 154 | KABH-2/S-9 | 1.82 | 3.73 | 95.01 | 0.13 | 1.12 |
| 155 | KABH-2/S-10 | 1.38 | 3.14 | 95.20 | 0.14 | 1.52 |
| 156 | KABH-2/S-11 | 0.87 | 2.84 | 96.47 | 0.12 | 0.57 |
| 157 | KABH-2/S-12 | 0.75 | 2.16 | 97.28 | 0.09 | 0.47 |
| 158 | KABH-2/S-13 | 1.31 | 3.94 | 94.51 | 0.16 | 1.39 |
| 159 | KABH-2/S-14 | 0.80 | 3.09 | 95.72 | 0.12 | 1.06 |
| 160 | KABH-2/S-15 | 0.99 | 2.55 | 96.57 | 0.10 | 0.78 |
| 161 | KABH-2/S-16 | 0.64 | 2.44 | 97.03 | 0.08 | 0.45 |
| 162 | KABH-2/S-17 | 0.30 | 0.53 | 99.12 | 0.04 | 0.31 |
| 163 | KABH-2/S-18 | 0.34 | 0.53 | 99.30 | 0.03 | 0.14 |
| 164 | KABH-2/S-19 | 0.42 | 1.59 | 98.06 | 0.07 | 0.28 |
| 165 | KABH-2/S-20 | 0.99 | 3.94 | 94.71 | 0.13 | 1.22 |
| 166 | KABH-2/S-21 | 1.17 | 3.79 | 94.59 | 0.14 | 1.48 |
| 167 | KABH-2/S-22 | 1.01 | 3.92 | 94.44 | 0.16 | 1.48 |
| 168 | KABH-2/S-23 | 1.11 | 3.43 | 95.05 | 0.11 | 1.41 |
| 169 | KABH-2/S-24 | 1.27 | 4.15 | 94.56 | 0.14 | 1.15 |

| Annexure XI Proximate analytical results for check samples (10% of the total Core samples) | | | | | |
|--|---------------|------------------------------|---------|---------------------|-----------------------------------|
| SL.NO. | SAMPLE NUMBER | ANALYSIS SAMPLE MOISTURE (%) | ASH (%) | VOLATILE MATTER (%) | FIXED CARBON/GRAPHITIC CARBON (%) |
| 1 | KABH-2/S-10 | 1.18 | 93.71 | 3.18 | 1.93 |
| 2 | KABH-2/S-15 | 0.57 | 95.85 | 2.82 | 0.77 |
| 3 | KABH-1/S-2 | 0.94 | 97.38 | 0.71 | 0.97 |
| 4 | KABH-2/S-21 | 0.85 | 93.71 | 3.61 | 1.82 |
| 5 | KKBH-1/S-04 | 1.02 | 90.85 | 4.55 | 3.58 |
| 6 | KKBH-1/S-13 | 1.27 | 92.77 | 4.97 | 0.99 |
| 7 | KKBH-2/S-02 | 1.92 | 92.12 | 5.36 | 0.60 |
| 8 | KKBH-2/S-11 | 1.04 | 90.92 | 4.06 | 3.99 |
| 9 | KKBH-2/S-14 | 1.11 | 88.36 | 4.89 | 5.64 |
| 10 | KKBH-3/S-06 | 0.71 | 91.37 | 3.66 | 4.26 |
| 11 | KKBH-3/S-10 | 1.25 | 92.24 | 4.41 | 2.11 |
| 12 | KTBH-1/S-14 | 0.18 | 99.13 | 0.67 | 0.02 |
| 13 | KTBH-1/S-20 | 1.51 | 88.59 | 4.82 | 5.07 |
| 14 | KTBH-2/S-10 | 0.21 | 99.01 | 0.75 | 0.03 |
| 15 | KTBH-2/S-26 | 0.18 | 98.85 | 0.90 | 0.06 |
| 16 | KTBH-3/S-10 | 1.15 | 95.34 | 3.47 | 0.05 |
| 17 | KTBH-3/S-14 | 1.70 | 88.39 | 5.48 | 4.43 |

| Annexure XII Analytical report of minor and trace elements (in ppm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------|------|------|----|------|-------|------|------|------|-------|------|------|------|------|------|------|------|------|------|-------|-------|------|------|------|-----|------|-----|-----|-----|-----|------|-----|------|------|------|------|------|------|-----|-----|-----|----|-----|-----|-----|----|
| SL. NO | SAMPLE NUMBER | Li | Be | B | Sc | Co | Ga | Ge | Se | Rb | Y | Nb | Mo | Cd | In | Sn | Sb | Te | Cs | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Hf | Ta | Tl | Bi | Th | U | Cu | Ni | Pb | Sr | Zn | W | Zr |
| 1 | KKBH-1/S-01 | 7.3 | <0.5 | <5 | 15.7 | 14.3 | 19.4 | <0.5 | <0.5 | 139.3 | 40.0 | 4.0 | 3.1 | <0.5 | <0.5 | <0.5 | 0.8 | <0.5 | 0.6 | 55.6 | 112.9 | 11.4 | 42.6 | 7.3 | 2.7 | 12.0 | 1.3 | 6.7 | 1.4 | 4.3 | 0.6 | 4.1 | 0.6 | 0.9 | 1.7 | <0.5 | <0.5 | 17.2 | 1.0 | 60 | 26 | 33 | 88 | 89 | <50 | 35 |
| 2 | KKBH-1/S-02 | 5.1 | 0.6 | <5 | 11.4 | 62.2 | 15.2 | <0.5 | <0.5 | 82.7 | 23.4 | 2.6 | 12.6 | 1.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 43.2 | 86.1 | 9.2 | 33.5 | 5.9 | 2.1 | 9.3 | 0.9 | 4.1 | 0.8 | 2.7 | <0.5 | 2.6 | <0.5 | 0.9 | 1.1 | <0.5 | <0.5 | 13.9 | 1.2 | 109 | 45 | 25 | 82 | 88 | 248 | 29 |
| 3 | KKBH-1/S-03 | 6.2 | 1.0 | <5 | 14.0 | 51.2 | 20.8 | <0.5 | 1.4 | 66.8 | 27.7 | 3.6 | 10.3 | 1.6 | <0.5 | 8.1 | 1.3 | <0.5 | <0.5 | 53.0 | 106.7 | 12.8 | 49.3 | 9.0 | 2.5 | 12.3 | 1.2 | 5.3 | 1.0 | 3.1 | <0.5 | 2.8 | <0.5 | 1.5 | 2.0 | <0.5 | <0.5 | 12.3 | 2.0 | 163 | 83 | 27 | 137 | 126 | 172 | 45 |
| 4 | KKBH-1/S-04 | 5.9 | <0.5 | <5 | 4.3 | 92.2 | 12.0 | <0.5 | <0.5 | 53.0 | 19.9 | 0.7 | 10.6 | 1.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 36.8 | 74.3 | 9.1 | 35.0 | 6.4 | 1.6 | 6.1 | 0.7 | 3.9 | 0.7 | 2.1 | <0.5 | 1.5 | <0.5 | 1.1 | 4.0 | <0.5 | <0.5 | 9.5 | 2.7 | 112 | 59 | 20 | 112 | 83 | 366 | 29 |
| 5 | KKBH-1/S-05 | 7.9 | <0.5 | <5 | 5.6 | 167.4 | 8.6 | <0.5 | 2.5 | 36.0 | 21.5 | <0.5 | 9.5 | 0.9 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 38.5 | 81.8 | 10.0 | 38.6 | 6.8 | 1.3 | 9.2 | 0.9 | 3.7 | 0.8 | 2.3 | <0.5 | 2.1 | <0.5 | 0.7 | <0.5 | <0.5 | <0.5 | 8.9 | 2.2 | 83 | 39 | 15 | 67 | 60 | 440 | 39 |
| 6 | KKBH-1/S-06 | 13.5 | 1.1 | <5 | 20.8 | 85.2 | 20.2 | <0.5 | 2.1 | 97.2 | 45.6 | 5.3 | 9.1 | 1.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 60.2 | 122.0 | 13.0 | 48.7 | 8.5 | 2.5 | 12.5 | 1.3 | 6.6 | 1.5 | 5.1 | 0.8 | 5.3 | 0.8 | 1.6 | 1.5 | <0.5 | <0.5 | 24.3 | 2.0 | 199 | 53 | 31 | 161 | 76 | 411 | 77 |
| 7 | KKBH-1/S-07 | 5.6 | 0.6 | <5 | 13.3 | 78.0 | 18.8 | <0.5 | 1.2 | 150.5 | 23.6 | 3.9 | 8.1 | 0.7 | <0.5 | <0.5 | 0.8 | <0.5 | 0.5 | 69.5 | 158.6 | 15.4 | 55.7 | 10.4 | 3.1 | 14.9 | 1.3 | 4.7 | 0.9 | 2.7 | <0.5 | 2.6 | <0.5 | 0.7 | 1.0 | 0.8 | 1.4 | 21.1 | 2.4 | 174 | 34 | 42 | 158 | 63 | 374 | 41 |
| 8 | KKBH-1/S-08 | 5.1 | 0.9 | <5 | 8.3 | 124.2 | 15.3 | <0.5 | <0.5 | 64.9 | 45.4 | 3.4 | 9.8 | 0.6 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 69.3 | 142.6 | 15.8 | 58.4 | 9.4 | 2.2 | 15.8 | 1.5 | 7.1 | 1.5 | 4.9 | 0.7 | 4.8 | 0.7 | 1.0 | 1.0 | <0.5 | <0.5 | 25.9 | 3.7 | 134 | 95 | 22 | 97 | 165 | 295 | 54 |
| 9 | KKBH-1/S-09 | 3.4 | 0.7 | <5 | 17.8 | 120.3 | 23.8 | <0.5 | 2.6 | 107.6 | 46.1 | 5.1 | 4.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 105.1 | 209.3 | 22.2 | 80.8 | 13.2 | 2.2 | 20.7 | 1.9 | 8.0 | 1.6 | 4.8 | 0.7 | 4.3 | 0.7 | 1.4 | 1.8 | <0.5 | <0.5 | 38.8 | 2.2 | 74 | 57 | 28 | 113 | 134 | 460 | 52 |
| 10 | KKBH-1/S-10 | 8.8 | 1.1 | <5 | 12.6 | 116.4 | 16.2 | <0.5 | 3.5 | 43.8 | 33.4 | 3.2 | 12.6 | 0.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 57.7 | 131.6 | 13.4 | 48.9 | 8.6 | 1.6 | 13.4 | 1.3 | 5.6 | 1.2 | 4.0 | 0.6 | 3.8 | 0.6 | 1.0 | 0.6 | <0.5 | <0.5 | 21.3 | 3.6 | 308 | 91 | 19 | 93 | 130 | 511 | 63 |
| 11 | KKBH-1/S-11 | 8.5 | 0.8 | <5 | 14.4 | 116.2 | 17.6 | <0.5 | 5.0 | 68.1 | 27.9 | 3.4 | 7.1 | 0.8 | <0.5 | 23.1 | 4.1 | <0.5 | <0.5 | 56.6 | 128.5 | 13.0 | 48.5 | 9.0 | 1.9 | 12.8 | 1.1 | 5.0 | 1.0 | 3.0 | <0.5 | 2.8 | <0.5 | 8.8 | <0.5 | <0.5 | 1.4 | 15.5 | 2.7 | 233 | 59 | 23 | 101 | 76 | 541 | 63 |
| 12 | KKBH-1/S-12 | 2.8 | 0.5 | <5 | 17.8 | 120.4 | 27.0 | <0.5 | 1.8 | 145.9 | 38.6 | 4.5 | 1.9 | 1.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 106.7 | 232.0 | 22.8 | 84.2 | 14.5 | 2.6 | 21.9 | 1.9 | 7.3 | 1.5 | 4.3 | 0.5 | 4.0 | 0.6 | 1.2 | 1.5 | <0.5 | 14.7 | 40.0 | 1.9 | 30 | 21 | 35 | 116 | 111 | 503 | 54 |
| 13 | KKBH-1/S-13 | 4.4 | 0.7 | <5 | 19.1 | 118.9 | 21.8 | <0.5 | <0.5 | 112.6 | 34.7 | 7.8 | 10.1 | 0.5 | <0.5 | 5.5 | 1.7 | 1.4 | 0.8 | 67.3 | 142.3 | 14.9 | 53.7 | 9.4 | 1.3 | 8.4 | 1.0 | 6.3 | 1.2 | 4.2 | <0.5 | 4.0 | 0.5 | 14.3 | 15.1 | <0.5 | <0.5 | 29.9 | 2.1 | 117 | 43 | 24 | 91 | 144 | 596 | 19 |
| 14 | KKBH-1/S-14 | 8.5 | 0.8 | <5 | 20.7 | 128.3 | 26.9 | <0.5 | 0.6 | 135.4 | 33.1 | 6.6 | 1.8 | <0.5 | <0.5 | <0.5 | 0.8 | <0.5 | 0.9 | 82.6 | 180.7 | 18.0 | 65.2 | 11.1 | 2.4 | 16.0 | 1.5 | 6.2 | 1.2 | 3.7 | 0.6 | 3.5 | 0.6 | 1.7 | 1.1 | 0.6 | 0.5 | 28.0 | 1.5 | 129 | 90 | 27 | 101 | 165 | 407 | 49 |
| 15 | KKBH-1/S-15 | 8.5 | 0.6 | <5 | 15.6 | 107.4 | 29.9 | <0.5 | 1.3 | 148.7 | 32.6 | 8.3 | 3.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | 82.6 | 170.7 | 17.8 | 65.5 | 11.0 | 2.4 | 16.3 | 1.4 | 5.8 | 1.2 | 3.6 | 0.5 | 3.3 | 0.5 | 1.4 | 2.8 | 0.5 | 7.0 | 27.2 | 1.5 | 189 | 76 | 29 | 95 | 128 | 382 | 41 |
| 16 | KKBH-1/S-16 | 7.9 | 1.1 | <5 | 17.0 | 80.8 | 28.8 | <0.5 | 0.9 | 86.9 | 49.0 | 3.2 | 2.2 | 1.8 | <0.5 | <0.5 | 2.1 | <0.5 | <0.5 | 111.8 | 240.5 | 25.5 | 92.6 | 14.2 | 2.9 | 21.7 | 2.1 | 8.8 | 1.7 | 5.4 | 0.7 | 4.6 | 0.7 | 2.1 | 1.2 | <0.5 | 2.9 | 48.1 | 1.2 | 49 | 37 | 19 | 116 | 132 | 333 | 49 |
| 17 | KKBH-1/S-17 | 15.8 | 2.1 | <5 | 15.2 | 68.7 | 20.4 | <0.5 | 1.7 | 94.6 | 22.9 | 4.5 | 3.6 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 2.1 | 51.8 | 112.9 | 12.1 | 43.6 | 7.5 | 2.0 | 10.9 | 1.0 | 4.0 | 0.8 | 2.5 | <0.5 | 2.3 | <0.5 | 0.9 | 0.8 | <0.5 | <0.5 | 17.7 | 1.4 | 52 | 102 | 15 | 69 | 150 | 255 | 61 |
| 18 | KKBH-1/S-18 | 14.7 | 1.8 | <5 | 16.8 | 87.8 | 24.9 | <0.5 | <0.5 | 111.8 | 26.0 | 6.4 | 4.6 | <0.5 | <0.5 | 12.5 | 3.9 | <0.5 | 1.3 | 68.2 | 146.1 | 15.1 | 53.2 | 8.2 | 2.1 | 12.9 | 1.1 | 4.7 | 0.9 | 2.9 | <0.5 | 2.6 | <0.5 | 4.7 | 1.4 | <0.5 | <0.5 | 24.5 | 2.0 | 49 | 82 | 13 | 56 | 188 | 295 | 83 |
| 19 | KKBH-1/S-19 | 8.5 | 1.7 | <5 | 11.1 | 86.3 | 20.7 | <0.5 | 0.6 | 96.8 | 23.0 | 5.4 | 6.0 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | 39.7 | 74.8 | 8.0 | 28.6 | 5.1 | 1.6 | 7.7 | 0.8 | 3.6 | 0.8 | 2.5 | <0.5 | 2.6 | <0.5 | 0.8 | 1.0 | <0.5 | <0.5 | 11.9 | 0.9 | 102 | 46 | 11 | 44 | 159 | 404 | 50 |
| 20 | KKBH-1/S-20 | 8.0 | 0.8 | <5 | 27.0 | 90.5 | 34.2 | <0.5 | 0.6 | 141.4 | 43.6 | 4.6 | 1.0 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 96.2 | 164.4 | 17.5 | 60.9 | 10.5 | 2.9 | 17.1 | 1.8 | 8.1 | 1.6 | 4.6 | 0.6 | 3.7 | 0.6 | 1.4 | 1.6 | <0.5 | <0.5 | 36.6 | 1.5 | 110 | 62 | 26 | 89 | 300 | 384 | 53 |
| 21 | KKBH-1/S-21 | 19.7 | 1.7 | <5 | 12.8 | 205.6 | 29.4 | <0.5 | <0.5 | 114.4 | 24.0 | 7.3 | 4.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.6 | 65.9 | 117.1 | 12.2 | 42.0 | 7.0 | 2.1 | 10.6 | 0.9 | 3.8 | 0.8 | 2.6 | <0.5 | 2.6 | <0.5 | 1.7 | 1.4 | <0.5 | <0.5 | 21.1 | 1.1 | 204 | 70 | 24 | 72 | 307 | 893 | 72 |
| 22 | KKBH-1/S-22 | 6.2 | 1.1 | <5 | 13.1 | 118.1 | 22.5 | <0.5 | 2.3 | 116.5 | 39.5 | 3.2 | 9.0 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.7 | 70.4 | 151.1 | 15.6 | 59.2 | 10.2 | 1.8 | 14.4 | 1.3 | 6.1 | 1.3 | 4.3 | 0.6 | 4.2 | 0.7 | 0.9 | 0.6 | <0.5 | <0.5 | 25.8 | 1.7 | 297 | 140 | 23 | 61 | 307 | 458 | 55 |
| 23 | KKBH-1/S-23 | 19.2 | 1.1 | <5 | 10.6 | 91.3 | 26.3 | <0.5 | 2.6 | 117.7 | 29.0 | 3.2 | 10.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | 56.4 | 109.9 | 11.7 | 41.7 | 7.5 | 1.9 | 11.0 | 1.0 | 4.4 | 1.0 | 2.9 | <0.5 | 2.6 | <0.5 | 1.2 | 1.1 | <0.5 | <0.5 | 17.1 | 1.5 | 147 | 96 | 22 | 78 | 198 | 428 | 65 |
| 24 | KKBH- | 10.2 | 1.3 | <5 | 6.2 | 121.3 | 22.2 | <0.5 | 5.5 | 98.9 | 26.9 | 2.9 | 16.6 | <0.5 | <0.5 | 1.2 | 1.9 | <0.5 | 0.6 | 70.3 | 141.0 | 15.4 | 58.6 | 10.3 | 2.0 | 14.7 | 1.2 | 4.7 | 0.9 | 2.8 | <0.5 | 2.5 | <0.5 | 2.0 | <0.5 | <0.5 | <0.5 | 23.0 | 2.0 | 222 | 169 | 22 | 74 | 282 | 524 | 61 |

| Annexure XII Analytical report of minor and trace elements (in ppm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------|------|------|----|------|-------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|-------|------|------|------|-----|------|-----|-----|------|-----|------|-----|------|------|------|------|------|------|-----|-----|-----|----|-----|-----|------|----|--|--|
| SL. NO | SAMPLE NUMBER | Li | Be | B | Sc | Co | Ga | Ge | Se | Rb | Y | Nb | Mo | Cd | In | Sn | Sb | Te | Cs | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Hf | Ta | Tl | Bi | Th | U | Cu | Ni | Pb | Sr | Zn | W | Zr | | |
| | 1/S-24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | KKBH-1/S-25 | 14.1 | 2.5 | <5 | 12.4 | 95.2 | 17.7 | <0.5 | 4.7 | 104.7 | 14.1 | 2.5 | 5.8 | 1.7 | <0.5 | <0.5 | <0.5 | <0.5 | 1.6 | 36.4 | 75.6 | 8.2 | 29.9 | 5.3 | 2.1 | 7.2 | 0.6 | 2.6 | <0.5 | 1.5 | <0.5 | 1.4 | <0.5 | 1.1 | <0.5 | 0.7 | <0.5 | 10.4 | 1.4 | 134 | 157 | 25 | 66 | 237 | 345 | 81 | | |
| 26 | KKBH-1/S-26 | 15.8 | 1.1 | <5 | 3.6 | 113.8 | 20.3 | <0.5 | 5.4 | 101.6 | 17.1 | 2.9 | 13.1 | 1.0 | <0.5 | 1.4 | <0.5 | <0.5 | <0.5 | 62.5 | 130.4 | 14.3 | 53.0 | 9.6 | 2.0 | 13.4 | 1.0 | 3.6 | 0.6 | 1.7 | <0.5 | 1.3 | <0.5 | 2.4 | 0.8 | <0.5 | 0.6 | 21.1 | 1.6 | 174 | 150 | 28 | 84 | 226 | 471 | 47 | | |
| 27 | KKBH-1/S-27 | 18.6 | 1.1 | <5 | 11.1 | 98.9 | 21.3 | <0.5 | 2.0 | 84.0 | 43.5 | 2.6 | 10.5 | 0.8 | <0.5 | <0.5 | 20.0 | <0.5 | <0.5 | 46.8 | 87.4 | 9.0 | 32.2 | 6.0 | 1.7 | 9.7 | 1.1 | 6.3 | 1.3 | 4.2 | 0.6 | 3.8 | 0.6 | 0.7 | 1.0 | 2.8 | <0.5 | 8.7 | 0.9 | 113 | 104 | 26 | 69 | 120 | 462 | 44 | | |
| 28 | KKBH-1/S-28 | 18.0 | 1.1 | <5 | 12.0 | 124.5 | 20.7 | <0.5 | 2.6 | 106.8 | 32.6 | 3.3 | 5.9 | 0.6 | <0.5 | <0.5 | 1.6 | <0.5 | <0.5 | 53.9 | 101.5 | 10.7 | 37.0 | 6.6 | 1.8 | 10.4 | 1.1 | 5.2 | 1.1 | 3.5 | <0.5 | 3.1 | <0.5 | 1.0 | 0.8 | <0.5 | <0.5 | 14.9 | 1.1 | 102 | 87 | 26 | 69 | 159 | 551 | 46 | | |
| 29 | KKBH-1/S-29 | 19.2 | 0.9 | <5 | 13.9 | 81.7 | 26.6 | <0.5 | 2.2 | 132.9 | 27.1 | 4.1 | 6.2 | 1.4 | <0.5 | 3.6 | <0.5 | <0.5 | 0.5 | 69.2 | 133.9 | 13.8 | 48.0 | 8.4 | 2.4 | 12.8 | 1.1 | 4.3 | 0.9 | 2.8 | <0.5 | 2.4 | <0.5 | 12.4 | 1.6 | <0.5 | <0.5 | 20.8 | 1.7 | 102 | 72 | 28 | 80 | 170 | 368 | 89 | | |
| 30 | KKBH-1/S-30 | 7.9 | 0.9 | <5 | 11.4 | 154.9 | 25.8 | <0.5 | 1.2 | 121.8 | 28.3 | 8.7 | 3.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 82.1 | 156.8 | 16.4 | 58.5 | 9.7 | 2.2 | 14.7 | 1.2 | 5.1 | 1.0 | 3.1 | <0.5 | 2.5 | <0.5 | 1.6 | 2.3 | <0.5 | 0.7 | 25.4 | 1.5 | 116 | 71 | 26 | 109 | 77 | 698 | 73 | | |
| 31 | KKBH-2/S-01 | 9.0 | 0.8 | <5 | 11.6 | 10.6 | 15.9 | <0.5 | <0.5 | 77.7 | 28.0 | 1.8 | 2.4 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 49.4 | 91.5 | 11.2 | 42.1 | 7.8 | 2.1 | 10.9 | 1.1 | 4.8 | 1.0 | 2.9 | <0.5 | 2.7 | <0.5 | 0.6 | <0.5 | <0.5 | <0.5 | 12.4 | 2.5 | 62 | 55 | 27 | 128 | 126 | <50 | 65 | | |
| 32 | KKBH-2/S-02 | 7.2 | <0.5 | <5 | 13.2 | 10.2 | 12.9 | <0.5 | <0.5 | 63.5 | 29.7 | <0.5 | 2.7 | 0.6 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 42.9 | 88.5 | 9.8 | 37.0 | 6.3 | 1.4 | 6.2 | 0.8 | 5.4 | 1.0 | 3.5 | <0.5 | 3.4 | <0.5 | 3.2 | 4.1 | <0.5 | 6.8 | 14.6 | 1.2 | 82 | 35 | 20 | 104 | 76 | <50 | 13 | | |
| 33 | KKBH-2/S-03 | 11.3 | 1.3 | <5 | 13.2 | 13.1 | 15.1 | <0.5 | <0.5 | 152.1 | 11.5 | 3.7 | 5.5 | 0.5 | <0.5 | 18.5 | 7.2 | <0.5 | 1.7 | 48.4 | 95.6 | 10.7 | 39.3 | 6.2 | 3.7 | 9.1 | 0.7 | 2.5 | <0.5 | 1.3 | <0.5 | 1.1 | <0.5 | 6.3 | <0.5 | 1.0 | <0.5 | 11.1 | 1.2 | 44 | 53 | 20 | 270 | 107 | <50 | 72 | | |
| 34 | KKBH-2/S-04 | 12.4 | 2.6 | <5 | 27.2 | 49.6 | 21.6 | <0.5 | <0.5 | 151.5 | 47.5 | 13.1 | 3.0 | <0.5 | <0.5 | 2.9 | 1.4 | <0.5 | 2.3 | 63.9 | 136.1 | 15.8 | 62.1 | 12.2 | 7.0 | 16.8 | 1.8 | 8.2 | 1.6 | 4.6 | 0.7 | 4.4 | 0.7 | 1.6 | 1.5 | 0.6 | <0.5 | 12.2 | 1.2 | 83 | 114 | 9 | 225 | 167 | 114 | 82 | | |
| 35 | KKBH-2/S-05 | 7.3 | 0.6 | <5 | 13.1 | 7.0 | 18.3 | <0.5 | <0.5 | 104.5 | 18.7 | 2.0 | 2.3 | 0.6 | <0.5 | <0.5 | 5.7 | <0.5 | 0.5 | 49.1 | 90.2 | 9.3 | 33.8 | 5.5 | 2.2 | 8.2 | 0.7 | 3.0 | 0.6 | 1.8 | <0.5 | 1.7 | <0.5 | 2.1 | 1.0 | <0.5 | <0.5 | 13.1 | 0.7 | 83 | 56 | 21 | 134 | 63 | <50 | 52 | | |
| 36 | KKBH-2/S-06 | 15.8 | 0.5 | <5 | 13.7 | 9.4 | 19.5 | <0.5 | <0.5 | 82.6 | 29.8 | 3.0 | 2.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 68.0 | 136.0 | 13.6 | 49.4 | 8.3 | 2.3 | 13.1 | 1.2 | 4.9 | 1.0 | 3.2 | <0.5 | 2.9 | <0.5 | 1.5 | <0.5 | <0.5 | <0.5 | 18.7 | 1.1 | 185 | 66 | 23 | 146 | 68 | <50 | 38 | | |
| 37 | KKBH-2/S-07 | 9.6 | <0.5 | <5 | 21.0 | 90.7 | 22.3 | <0.5 | 1.3 | 94.8 | 48.4 | 3.5 | 2.4 | 0.8 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 74.1 | 144.3 | 15.0 | 54.0 | 9.0 | 2.3 | 14.9 | 1.6 | 7.9 | 1.6 | 5.0 | 0.7 | 4.7 | 0.7 | 0.9 | 1.1 | <0.5 | 2.8 | 24.8 | 1.4 | 112 | 58 | 29 | 130 | 99 | 416 | 42 | | |
| 38 | KKBH-2/S-08 | 7.9 | <0.5 | <5 | 10.6 | 32.8 | 16.7 | <0.5 | 0.7 | 93.4 | 37.1 | 2.0 | 4.0 | 0.7 | <0.5 | <0.5 | <0.5 | <0.5 | 0.6 | 63.8 | 130.0 | 14.3 | 52.6 | 8.7 | 2.3 | 13.4 | 1.3 | 5.6 | 1.2 | 3.9 | 0.6 | 3.8 | 0.6 | 0.6 | <0.5 | <0.5 | <0.5 | 20.9 | 1.8 | 86 | 82 | 20 | 147 | 166 | <50 | 57 | | |
| 39 | KKBH-2/S-09 | 11.8 | 0.9 | <5 | 7.7 | 17.5 | 11.0 | <0.5 | 2.6 | 88.6 | 28.3 | 3.2 | 5.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 1.0 | 31.7 | 62.9 | 8.0 | 31.7 | 6.9 | 1.9 | 9.1 | 1.0 | 5.0 | 1.0 | 2.7 | <0.5 | 2.5 | <0.5 | 0.5 | <0.5 | <0.5 | <0.5 | 5.4 | 1.7 | 160 | 70 | 17 | 79 | 136 | <50 | 49 | | |
| 40 | KKBH-2/S-10 | 12.4 | 1.6 | <5 | 14.4 | 13.1 | 15.4 | <0.5 | 1.9 | 99.8 | 32.7 | 1.7 | 6.4 | 3.0 | <0.5 | <0.5 | <0.5 | <0.5 | 1.0 | 40.9 | 81.6 | 9.9 | 36.7 | 7.4 | 2.6 | 10.3 | 1.1 | 5.6 | 1.1 | 3.3 | <0.5 | 3.2 | <0.5 | 1.1 | <0.5 | 0.6 | <0.5 | 10.8 | 3.9 | 139 | 68 | 24 | 140 | 307 | <50 | 95 | | |
| 41 | KKBH-2/S-11 | 10.7 | <0.5 | <5 | 8.7 | 13.2 | 11.2 | <0.5 | <0.5 | 98.5 | 19.6 | <0.5 | 13.1 | 1.6 | <0.5 | <0.5 | <0.5 | <0.5 | 0.6 | 43.4 | 83.1 | 9.9 | 37.0 | 6.6 | 1.9 | 6.4 | 0.7 | 3.8 | 0.7 | 2.4 | <0.5 | 2.5 | <0.5 | 0.8 | 3.9 | <0.5 | <0.5 | 16.3 | 1.7 | 189 | 101 | 26 | 117 | 130 | <50 | 13 | | |
| 42 | KKBH-2/S-12 | 13.0 | 1.1 | <5 | 14.0 | 24.0 | 16.9 | <0.5 | 1.8 | 96.2 | 30.4 | 2.4 | 8.6 | 1.3 | <0.5 | <0.5 | <0.5 | <0.5 | 0.7 | 45.9 | 98.4 | 10.5 | 39.9 | 7.5 | 1.9 | 11.0 | 1.1 | 5.3 | 1.0 | 3.1 | <0.5 | 2.8 | <0.5 | 3.1 | <0.5 | <0.5 | <0.5 | 14.5 | 2.1 | 219 | 104 | 25 | 79 | 161 | <50 | 57 | | |
| 43 | KKBH-2/S-13 | 11.8 | 1.5 | <5 | 18.9 | 24.0 | 19.7 | <0.5 | <0.5 | 112.1 | 42.2 | 4.0 | 2.4 | 1.5 | <0.5 | <0.5 | <0.5 | <0.5 | 1.0 | 58.8 | 119.7 | 12.5 | 45.1 | 7.8 | 2.7 | 12.7 | 1.2 | 6.4 | 1.4 | 4.7 | 0.7 | 4.7 | 0.8 | 0.9 | 0.8 | 0.5 | <0.5 | 18.8 | 1.4 | 150 | 64 | 26 | 135 | 209 | <50 | 55 | | |
| 44 | KKBH-2/S-14 | 6.6 | <0.5 | <5 | 5.6 | 17.9 | 11.8 | <0.5 | <0.5 | 62.5 | 21.2 | 0.6 | 13.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 47.4 | 99.9 | 10.9 | 41.7 | 7.4 | 1.1 | 6.9 | 0.7 | 3.8 | 0.7 | 2.4 | <0.5 | 2.0 | <0.5 | 1.1 | 6.0 | <0.5 | <0.5 | 21.3 | 1.5 | 218 | 110 | 15 | 66 | 113 | <50 | 7 | | |
| 45 | KKBH-2/S-15 | 13.0 | 0.7 | <5 | 16.4 | 24.5 | 20.8 | <0.5 | 1.2 | 114.7 | 41.6 | 3.3 | 1.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 68.0 | 133.9 | 13.7 | 48.5 | 8.7 | 2.5 | 14.3 | 1.5 | 7.4 | 1.4 | 4.2 | 0.6 | 4.1 | 0.6 | 1.1 | 1.1 | <0.5 | <0.5 | 21.7 | 1.2 | 71 | 43 | 30 | 122 | 91 | <50 | 55 | | |
| 46 | KKBH-2/S-16 | 7.9 | 0.9 | <5 | 18.0 | 36.9 | 22.3 | <0.5 | <0.5 | 135.3 | 42.9 | 2.2 | <0.5 | <0.5 | <0.5 | 0.9 | 1.4 | <0.5 | 0.7 | 70.8 | 139.3 | 14.7 | 53.2 | 9.3 | 2.2 | 14.3 | 1.5 | 7.0 | 1.4 | 4.5 | 0.6 | 3.9 | 0.6 | 0.9 | 0.9 | 0.6 | 15.1 | 23.1 | 1.7 | 101 | 58 | 31 | 95 | 95 | <50 | 47 | | |
| 47 | KKBH-2/S-17 | 7.9 | <0.5 | <5 | 12.4 | 194.9 | 18.7 | <0.5 | 0.5 | 139.7 | 36.8 | 1.6 | 1.7 | <0.5 | <0.5 | 6.4 | <0.5 | <0.5 | <0.5 | 57.7 | 115.9 | 11.5 | 40.9 | 7.2 | 2.5 | 11.8 | 1.2 | 6.0 | 1.2 | 3.9 | 0.5 | 3.7 | 0.6 | 0.7 | <0.5 | <0.5 | 3.8 | 17.1 | 1.0 | 76 | 50 | 34 | 119 | 110 | 1016 | 42 | | |

| Annexure XII Analytical report of minor and trace elements (in ppm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------|------|------|----|------|-------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|-------|------|------|-----|-----|------|-----|-----|------|-----|------|-----|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|------|------|----|
| SL. NO | SAMPLE NUMBER | Li | Be | B | Sc | Co | Ga | Ge | Se | Rb | Y | Nb | Mo | Cd | In | Sn | Sb | Te | Cs | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Hf | Ta | Tl | Bi | Th | U | Cu | Ni | Pb | Sr | Zn | W | Zr | |
| 48 | KKBH-2/S-18 | 9.0 | 0.6 | <5 | 12.5 | 27.1 | 19.6 | <0.5 | <0.5 | 147.9 | 30.8 | 1.9 | 0.8 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 54.2 | 106.0 | 10.4 | 37.2 | 6.7 | 2.8 | 11.2 | 1.2 | 5.4 | 1.0 | 3.1 | <0.5 | 2.7 | <0.5 | 1.3 | 0.6 | <0.5 | <0.5 | 15.6 | 0.9 | 74 | 40 | 34 | 147 | 98 | <50 | 41 | |
| 49 | KKBH-2/S-19 | 2.8 | 0.6 | <5 | 16.8 | 45.9 | 21.8 | <0.5 | 0.9 | 120.4 | 44.9 | 2.0 | 1.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 66.0 | 140.0 | 13.8 | 49.6 | 9.1 | 2.2 | 14.8 | 1.5 | 7.3 | 1.5 | 4.7 | 0.7 | 4.2 | 0.7 | 1.9 | 0.6 | <0.5 | 1.5 | 21.5 | 1.3 | 137 | 72 | 29 | 94 | 101 | <50 | 53 | |
| 50 | KKBH-2/S-20 | 7.3 | 0.7 | <5 | 15.6 | 46.6 | 22.0 | <0.5 | <0.5 | 138.5 | 40.0 | 2.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 60.2 | 121.5 | 11.8 | 41.5 | 7.9 | 2.6 | 12.8 | 1.4 | 6.9 | 1.4 | 4.2 | 0.6 | 3.8 | 0.6 | 1.5 | 0.5 | <0.5 | <0.5 | 18.7 | 1.5 | 48 | 45 | 33 | 113 | 83 | <50 | 45 | |
| 51 | KKBH-2/S-21 | 4.5 | 0.7 | <5 | 12.4 | 272.9 | 18.0 | <0.5 | 1.1 | 147.1 | 36.1 | 1.0 | 1.7 | <0.5 | <0.5 | <0.5 | 0.9 | <0.5 | 0.5 | 45.0 | 92.7 | 9.5 | 35.6 | 6.6 | 2.0 | 10.4 | 1.2 | 5.7 | 1.2 | 3.8 | 0.5 | 3.3 | 0.5 | 1.1 | 0.7 | 0.6 | <0.5 | 13.7 | 1.2 | 104 | 66 | 31 | 91 | 96 | 1275 | 44 | |
| 52 | KKBH-2/S-22 | 2.8 | 0.8 | <5 | 18.6 | 216.4 | 26.1 | <0.5 | <0.5 | 55.3 | 42.5 | 2.3 | 4.8 | <0.5 | <0.5 | 3.9 | 2.3 | <0.5 | <0.5 | 60.9 | 138.7 | 13.1 | 47.8 | 9.4 | 1.3 | 14.4 | 1.5 | 7.5 | 1.5 | 4.6 | 0.7 | 4.4 | 0.7 | 1.6 | 0.8 | <0.5 | <0.5 | 17.6 | 1.4 | 15 | 18 | 32 | 51 | 130 | 993 | 48 | |
| 53 | KKBH-2/S-23 | 1.7 | 0.6 | <5 | 15.4 | 132.8 | 19.6 | <0.5 | 1.2 | 89.6 | 46.1 | 2.5 | 3.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 47.2 | 99.3 | 10.0 | 37.2 | 7.6 | 2.1 | 11.8 | 1.3 | 7.3 | 1.6 | 4.8 | 0.7 | 4.3 | 0.7 | 1.0 | 1.4 | <0.5 | <0.5 | 12.6 | 0.9 | 131 | 87 | 26 | 48 | 92 | 718 | 31 | |
| 54 | KKBH-2/S-24 | <0.5 | 0.5 | <5 | 18.6 | 207.0 | 25.0 | <0.5 | <0.5 | 130.2 | 40.2 | 1.7 | <0.5 | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.6 | 55.5 | 121.5 | 11.7 | 42.9 | 8.5 | 2.2 | 12.8 | 1.4 | 6.9 | 1.4 | 4.2 | 0.6 | 3.9 | 0.6 | 1.8 | 1.0 | <0.5 | <0.5 | 16.9 | 1.0 | 15 | 24 | 35 | 59 | 147 | 1098 | 42 | |
| 55 | KKBH-2/S-25 | 11.3 | 1.0 | <5 | 15.5 | 22.0 | 20.0 | <0.5 | 0.9 | 99.2 | 36.6 | 4.8 | 4.4 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 1.9 | 51.0 | 113.3 | 11.4 | 42.7 | 8.0 | 1.9 | 12.3 | 1.3 | 6.3 | 1.3 | 3.9 | 0.6 | 3.6 | 0.6 | 1.0 | 1.4 | <0.5 | <0.5 | 17.4 | 2.1 | 63 | 67 | 21 | 94 | 116 | <50 | 67 | |
| 56 | KKBH-2/S-26 | 6.2 | 0.5 | <5 | 19.2 | 23.5 | 20.9 | <0.5 | 1.5 | 162.8 | 40.7 | 2.3 | 3.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 1.3 | 54.4 | 110.0 | 11.6 | 42.7 | 7.7 | 2.0 | 12.7 | 1.4 | 6.8 | 1.4 | 4.4 | 0.6 | 4.3 | 0.7 | 1.4 | 1.1 | 0.6 | 0.6 | 17.1 | 1.2 | 106 | 60 | 29 | 103 | 104 | <50 | 42 | |
| 57 | KKBH-3/S-01 | 6.2 | 0.8 | <5 | 3.0 | 278.0 | 12.4 | <0.5 | 5.5 | 55.4 | 10.0 | 2.3 | 11.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 46.0 | 104.3 | 11.7 | 43.9 | 6.9 | 1.5 | 9.9 | 0.8 | 2.3 | <0.5 | 1.2 | <0.5 | 0.8 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 20.0 | 1.0 | 246 | 107 | 17 | 55 | 54 | 1080 | 24 |
| 58 | KKBH-3/S-02 | 4.5 | <0.5 | <5 | 3.4 | 288.5 | 9.0 | <0.5 | 4.0 | 47.3 | 14.9 | <0.5 | 15.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 28.1 | 58.1 | 7.4 | 28.8 | 5.3 | 1.4 | 7.3 | 0.7 | 3.0 | 0.5 | 1.5 | <0.5 | 1.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 6.3 | 2.3 | 189 | 103 | 13 | 45 | 43 | 1156 | 48 |
| 59 | KKBH-3/S-03 | 6.2 | 0.7 | <5 | 6.0 | 167.0 | 10.4 | <0.5 | 1.2 | 59.2 | 17.4 | 1.0 | 2.0 | 2.1 | <0.5 | <0.5 | <0.5 | <0.5 | 1.0 | 21.7 | 45.1 | 5.7 | 22.7 | 5.4 | 1.8 | 7.5 | 0.9 | 4.4 | 0.8 | 2.3 | <0.5 | 2.0 | <0.5 | 1.0 | 0.7 | 0.5 | <0.5 | 4.0 | 2.0 | 167 | 69 | 16 | 53 | 82 | 716 | 47 | |
| 60 | KKBH-3/S-04 | 5.1 | 0.7 | <5 | 6.9 | 304.4 | 11.3 | <0.5 | 2.6 | 65.1 | 27.1 | <0.5 | 11.5 | 0.6 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 35.5 | 78.1 | 8.9 | 34.2 | 6.9 | 2.0 | 9.8 | 1.0 | 4.7 | 1.0 | 3.1 | <0.5 | 3.0 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.7 | 6.8 | 3.1 | 223 | 96 | 18 | 57 | 81 | 1286 | 60 |
| 61 | KKBH-3/S-05 | 5.6 | 1.1 | <5 | 13.7 | 179.9 | 16.3 | <0.5 | 2.0 | 109.1 | 31.8 | 4.2 | 5.6 | 0.9 | <0.5 | 8.6 | <0.5 | <0.5 | 0.6 | 56.4 | 124.9 | 13.0 | 49.7 | 8.3 | 2.4 | 12.5 | 1.3 | 5.6 | 1.1 | 3.4 | <0.5 | 3.0 | <0.5 | 4.4 | 1.0 | <0.5 | <0.5 | 22.3 | 1.6 | 183 | 83 | 34 | 93 | 80 | 869 | 46 | |
| 62 | KKBH-3/S-06 | 5.2 | <0.5 | <5 | 9.2 | 278.9 | 11.3 | <0.5 | <0.5 | 78.5 | 39.7 | <0.5 | 5.9 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 41.3 | 85.0 | 9.6 | 37.7 | 7.2 | 1.6 | 7.5 | 1.0 | 6.5 | 1.3 | 4.3 | 0.5 | 4.2 | 0.5 | 0.9 | 4.5 | <0.5 | <0.5 | 19.1 | 2.3 | 127 | 85 | 25 | 105 | 61 | 854 | 14 | |
| 63 | KKBH-3/S-07 | 6.8 | <0.5 | <5 | 11.3 | 224.2 | 15.2 | <0.5 | <0.5 | 107.8 | 36.6 | 0.7 | 6.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 54.3 | 107.2 | 12.0 | 44.0 | 7.7 | 2.0 | 11.6 | 1.1 | 5.6 | 1.2 | 3.9 | 0.5 | 3.7 | 0.6 | 1.1 | <0.5 | <0.5 | <0.5 | 16.8 | 2.0 | 107 | 62 | 29 | 105 | 65 | 1062 | 57 | |
| 64 | KKBH-3/S-08 | 5.1 | 0.7 | <5 | 15.6 | 176.2 | 18.6 | <0.5 | 1.5 | 135.5 | 40.5 | 4.1 | 2.0 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.7 | 64.1 | 130.0 | 13.4 | 48.9 | 8.4 | 2.4 | 13.5 | 1.3 | 6.9 | 1.4 | 4.3 | 0.7 | 4.1 | 0.7 | 0.8 | 1.0 | <0.5 | <0.5 | 22.6 | 1.6 | 185 | 77 | 32 | 116 | 52 | 947 | 40 | |
| 65 | KKBH-3/S-09 | 7.9 | <0.5 | <5 | 9.4 | 218.7 | 15.7 | <0.5 | <0.5 | 143.5 | 26.4 | 1.6 | 1.7 | <0.5 | <0.5 | 0.6 | <0.5 | <0.5 | <0.5 | 63.9 | 124.2 | 12.8 | 47.3 | 7.6 | 3.0 | 12.2 | 1.1 | 4.7 | 0.9 | 2.7 | <0.5 | 2.3 | <0.5 | 0.7 | 0.7 | <0.5 | 0.7 | 21.1 | 0.8 | 51 | 31 | 33 | 137 | 58 | 1140 | 34 | |
| 66 | KKBH-3/S-10 | 5.7 | <0.5 | <5 | 14.9 | 259.0 | 14.9 | <0.5 | <0.5 | 91.6 | 43.9 | 0.6 | 5.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 59.7 | 124.3 | 12.8 | 47.4 | 8.5 | 1.5 | 9.2 | 1.3 | 7.6 | 1.5 | 4.9 | 0.6 | 4.5 | 0.6 | 1.3 | 4.9 | <0.5 | <0.5 | 26.6 | 1.8 | 202 | 48 | 21 | 66 | 82 | 1358 | 13 | |
| 67 | KTBH-1/S-01 | 5.1 | <0.5 | <5 | 20.6 | 282.2 | 18.2 | <0.5 | <0.5 | 120.6 | 32.6 | 5.2 | 0.8 | <0.5 | <0.5 | 10.2 | <0.5 | <0.5 | <0.5 | 46.5 | 87.7 | 9.1 | 32.5 | 6.4 | 2.3 | 10.6 | 1.2 | 5.6 | 1.1 | 3.5 | <0.5 | 3.3 | 0.6 | 3.5 | 1.2 | <0.5 | <0.5 | 14.6 | 0.6 | 69 | 12 | 18 | 133 | 79 | 1599 | 51 | |
| 68 | KTBH-1/S-02 | 14.1 | 0.6 | <5 | 17.7 | 191.2 | 16.9 | <0.5 | <0.5 | 142.1 | 29.9 | 3.6 | 1.0 | <0.5 | <0.5 | 2.1 | 1.1 | <0.5 | 0.6 | 41.9 | 75.8 | 7.5 | 26.1 | 5.9 | 2.4 | 9.2 | 1.0 | 5.2 | 1.0 | 3.0 | <0.5 | 3.1 | <0.5 | 1.4 | 0.8 | <0.5 | 0.5 | 10.3 | 0.7 | 25 | 39 | 24 | 153 | 70 | 975 | 38 | |
| 69 | KTBH-1/S-03 | 8.5 | 0.6 | <5 | 18.6 | 211.8 | 19.1 | <0.5 | <0.5 | 134.4 | 32.0 | 9.9 | 4.0 | <0.5 | <0.5 | 9.0 | 0.5 | <0.5 | <0.5 | 44.8 | 85.1 | 8.5 | 30.8 | 6.5 | 2.2 | 10.1 | 1.1 | 5.5 | 1.2 | 3.3 | <0.5 | 3.2 | 0.5 | 2.0 | 0.9 | <0.5 | <0.5 | 14.5 | 0.6 | 23 | 31 | 23 | 132 | 73 | 1186 | 37 | |
| 70 | KTBH-1/S-04 | 6.8 | <0.5 | <5 | 17.1 | 183.7 | 17.6 | <0.5 | <0.5 | 145.6 | 35.2 | 3.9 | <0.5 | <0.5 | <0.5 | 1.7 | <0.5 | <0.5 | <0.5 | 37.2 | 64.7 | 6.1 | 21.5 | 5.6 | 2.4 | 9.5 | 1.2 | 6.1 | 1.2 | 3.7 | 0.5 | 3.5 | 0.6 | 0.6 | 1.1 | <0.5 | <0.5 | 9.1 | <0.5 | 28 | 35 | 23 | 124 | 71 | 1020 | 33 | |
| 71 | KTBH- | 12.4 | 0.6 | <5 | 20.4 | 224.3 | 18.7 | <0.5 | <0.5 | 122.5 | 35.3 | 7.0 | <0.5 | <0.5 | <0.5 | 2.7 | <0.5 | <0.5 | <0.5 | 48.3 | 94.3 | 9.5 | 33.8 | 6.8 | 2.2 | 11.3 | 1.3 | 6.3 | 1.3 | 3.8 | 0.5 | 3.6 | 0.5 | 1.1 | 2.0 | <0.5 | <0.5 | 15.3 | 0.8 | 25 | 30 | 20 | 148 | 73 | 1223 | 45 | |

| Annexure XII Analytical report of minor and trace elements (in ppm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------|------|------|----|------|-------|------|------|------|-------|------|------|------|------|------|------|------|------|------|-------|-------|------|------|-----|------|------|-----|-----|------|------|------|------|------|------|------|------|------|------|------|-----|----|-----|-----|------|------|----|--|--|
| SL. NO | SAMPLE NUMBER | Li | Be | B | Sc | Co | Ga | Ge | Se | Rb | Y | Nb | Mo | Cd | In | Sn | Sb | Te | Cs | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Hf | Ta | Tl | Bi | Th | U | Cu | Ni | Pb | Sr | Zn | W | Zr | | |
| | 1/S-05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72 | KTBH-1/S-06 | 16.9 | 0.8 | <5 | 17.7 | 202.6 | 21.0 | <0.5 | <0.5 | 107.1 | 28.1 | 6.3 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 68.2 | 144.4 | 15.1 | 54.1 | 8.8 | 2.2 | 13.7 | 1.2 | 5.2 | 1.0 | 3.2 | <0.5 | 2.9 | <0.5 | 1.4 | 1.7 | <0.5 | <0.5 | 23.5 | 1.1 | 27 | 26 | 27 | 190 | 69 | 1111 | 47 | | | |
| 73 | KTBH-1/S-07 | 19.2 | 0.5 | <5 | 18.3 | 260.8 | 21.2 | <0.5 | 1.2 | 115.6 | 35.2 | 3.5 | 9.6 | <0.5 | <0.5 | 18.2 | 0.6 | <0.5 | <0.5 | 67.6 | 138.4 | 14.5 | 51.8 | 9.3 | 2.3 | 14.2 | 1.3 | 6.3 | 1.3 | 3.9 | 0.5 | 3.4 | 0.6 | 2.3 | 0.8 | <0.5 | 6.9 | 23.1 | 0.8 | 20 | 24 | 26 | 146 | 73 | 1466 | 41 | | |
| 74 | KTBH-1/S-08 | 18.0 | <0.5 | <5 | 15.6 | 275.0 | 18.0 | <0.5 | <0.5 | 126.6 | 29.7 | 4.0 | <0.5 | <0.5 | <0.5 | 7.0 | 2.8 | <0.5 | <0.5 | 48.7 | 91.0 | 9.1 | 31.5 | 5.6 | 2.4 | 9.8 | 1.0 | 5.0 | 1.0 | 3.1 | <0.5 | 2.8 | <0.5 | 4.2 | 1.7 | <0.5 | <0.5 | 13.5 | 0.7 | 34 | 37 | 25 | 184 | 57 | 1566 | 44 | | |
| 75 | KTBH-1/S-09 | 11.8 | <0.5 | <5 | 13.5 | 303.8 | 16.6 | <0.5 | <0.5 | 101.7 | 25.2 | 2.9 | <0.5 | <0.5 | <0.5 | 2.0 | <0.5 | <0.5 | <0.5 | 50.4 | 93.9 | 9.6 | 32.8 | 5.7 | 2.1 | 9.5 | 0.9 | 4.1 | 0.9 | 2.7 | <0.5 | 2.7 | <0.5 | 0.8 | 0.9 | <0.5 | <0.5 | 16.1 | 0.7 | 30 | 30 | 20 | 163 | 54 | 1786 | 53 | | |
| 76 | KTBH-1/S-10 | 6.2 | <0.5 | <5 | 14.7 | 234.6 | 17.0 | <0.5 | <0.5 | 104.7 | 29.6 | 5.5 | <0.5 | <0.5 | <0.5 | 1.7 | 8.4 | <0.5 | <0.5 | 46.0 | 87.4 | 8.6 | 29.6 | 5.8 | 2.0 | 9.4 | 1.0 | 4.7 | 1.1 | 3.1 | <0.5 | 3.1 | <0.5 | 1.0 | 0.9 | 0.8 | <0.5 | 13.3 | 0.8 | 22 | 23 | 26 | 151 | 53 | 1416 | 46 | | |
| 77 | KTBH-1/S-11 | 13.5 | <0.5 | <5 | 16.3 | 236.0 | 20.2 | <0.5 | <0.5 | 145.4 | 31.7 | 8.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 50.9 | 97.4 | 9.6 | 33.7 | 6.3 | 2.6 | 10.8 | 1.2 | 5.6 | 1.1 | 3.4 | 0.5 | 3.3 | <0.5 | 0.9 | 1.8 | 0.6 | 2.3 | 17.3 | 0.9 | 24 | 29 | 29 | 136 | 60 | 1453 | 40 | | |
| 78 | KTBH-1/S-12 | 16.4 | <0.5 | <5 | 18.1 | 221.7 | 21.8 | <0.5 | <0.5 | 144.4 | 31.7 | 11.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 53.9 | 110.1 | 11.3 | 40.4 | 7.6 | 2.3 | 11.8 | 1.2 | 6.0 | 1.2 | 3.6 | 0.5 | 3.4 | 0.5 | 0.9 | 1.8 | 0.6 | <0.5 | 21.1 | 0.8 | 50 | 38 | 26 | 128 | 74 | 1294 | 33 | | |
| 79 | KTBH-1/S-14 | 8.7 | <0.5 | <5 | 7.5 | 231.1 | 12.6 | <0.5 | <0.5 | 179.6 | 15.4 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 69.9 | 139.2 | 14.3 | 50.0 | 8.7 | 1.7 | 8.2 | 0.8 | 3.6 | 0.5 | 1.6 | <0.5 | 1.3 | <0.5 | 1.5 | 4.2 | <0.5 | <0.5 | 38.0 | 1.8 | 15 | 16 | 41 | 133 | 43 | 1205 | 23 | | |
| 80 | KTBH-1/S-13 | 10.2 | <0.5 | <5 | 16.5 | 234.1 | 20.0 | <0.5 | <0.5 | 146.1 | 31.7 | 7.4 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 55.7 | 113.1 | 11.6 | 40.8 | 7.7 | 2.3 | 11.7 | 1.3 | 6.0 | 1.2 | 3.5 | <0.5 | 3.4 | 0.5 | 0.7 | 1.3 | <0.5 | <0.5 | 21.8 | 0.8 | 22 | 32 | 28 | 100 | 69 | 1365 | 34 | | |
| 81 | KTBH-1/S-15 | 11.3 | <0.5 | <5 | 14.9 | 255.0 | 19.1 | <0.5 | <0.5 | 140.8 | 31.7 | 6.8 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 58.7 | 118.3 | 11.8 | 43.2 | 7.9 | 2.2 | 12.5 | 1.2 | 5.9 | 1.2 | 3.6 | 0.5 | 3.4 | 0.5 | 0.7 | 1.2 | <0.5 | <0.5 | 21.8 | 1.0 | 10 | 22 | 33 | 138 | 56 | 1473 | 36 | | |
| 82 | KTBH-1/S-16 | 19.7 | <0.5 | <5 | 19.5 | 241.5 | 19.3 | <0.5 | <0.5 | 136.3 | 33.9 | 7.5 | <0.5 | <0.5 | <0.5 | 5.2 | 0.9 | <0.5 | 0.5 | 59.4 | 116.9 | 11.8 | 41.2 | 7.9 | 2.4 | 12.4 | 1.3 | 6.1 | 1.2 | 3.7 | 0.5 | 3.4 | 0.5 | 2.4 | 2.7 | <0.5 | 0.5 | 21.0 | 1.0 | 17 | 33 | 27 | 136 | 63 | 1388 | 44 | | |
| 83 | KTBH-1/S-17 | 15.2 | <0.5 | <5 | 20.9 | 231.1 | 19.7 | <0.5 | <0.5 | 150.4 | 36.5 | 15.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 65.9 | 132.8 | 13.6 | 49.2 | 9.1 | 2.4 | 14.2 | 1.5 | 6.6 | 1.3 | 4.0 | 0.5 | 3.7 | 0.6 | 1.9 | 2.3 | <0.5 | <0.5 | 23.2 | 1.2 | 40 | 34 | 29 | 110 | 67 | 1306 | 48 | | |
| 84 | KTBH-1/S-18 | 5.1 | <0.5 | <5 | 20.5 | 228.7 | 21.8 | <0.5 | <0.5 | 135.7 | 42.6 | 12.0 | <0.5 | <0.5 | <0.5 | 4.3 | <0.5 | <0.5 | <0.5 | 68.1 | 143.1 | 15.0 | 54.8 | 9.8 | 2.6 | 14.3 | 1.6 | 7.7 | 1.6 | 4.7 | 0.7 | 4.3 | 0.7 | 1.7 | 2.0 | <0.5 | <0.5 | 26.7 | 1.2 | 49 | 38 | 27 | 103 | 71 | 1256 | 41 | | |
| 85 | KTBH-1/S-19 | 48.5 | <0.5 | <5 | 17.6 | 269.6 | 18.3 | <0.5 | <0.5 | 157.4 | 34.4 | 7.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 56.4 | 108.6 | 10.9 | 38.4 | 7.8 | 2.6 | 12.1 | 1.3 | 6.0 | 1.2 | 3.7 | <0.5 | 3.4 | 0.5 | 0.9 | 1.4 | 0.5 | <0.5 | 19.1 | 0.8 | 26 | 25 | 30 | 122 | 63 | 1483 | 37 | | |
| 86 | KTBH-1/S-20 | 17.4 | 1.3 | <5 | 9.6 | 177.9 | 9.2 | <0.5 | <0.5 | 40.2 | 33.7 | <0.5 | 8.5 | 1.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 32.4 | 66.4 | 8.3 | 34.0 | 6.9 | 1.3 | 7.3 | 0.9 | 5.7 | 1.1 | 3.7 | <0.5 | 3.2 | <0.5 | 0.8 | 2.0 | <0.5 | <0.5 | 7.3 | <0.5 | 273 | 93 | 8 | 73 | 176 | 933 | 5 | | |
| 87 | KTBH-1/S-21 | 16.4 | 1.1 | <5 | 11.7 | 168.3 | 14.2 | <0.5 | 1.6 | 27.0 | 19.4 | 1.0 | 6.9 | 0.8 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 27.7 | 56.7 | 6.6 | 25.5 | 4.8 | 1.6 | 6.6 | 0.7 | 3.2 | 0.6 | 2.1 | <0.5 | 1.6 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 5.6 | 0.7 | 159 | 80 | 12 | 143 | 219 | 707 | 17 | | |
| 88 | KTBH-1/S-22 | 9.0 | 0.6 | <5 | 10.8 | 313.1 | 10.0 | <0.5 | 3.4 | 39.5 | 14.1 | 1.5 | 12.8 | 0.6 | <0.5 | 4.2 | <0.5 | <0.5 | <0.5 | 21.1 | 48.1 | 6.4 | 27.1 | 5.8 | 1.3 | 5.5 | 0.6 | 2.4 | <0.5 | 1.3 | <0.5 | 0.9 | <0.5 | 1.3 | <0.5 | <0.5 | <0.5 | 1.3 | <0.5 | 223 | 96 | 11 | 98 | 117 | 1229 | 8 | | |
| 89 | KTBH-2/S-01 | 7.9 | <0.5 | <5 | 14.9 | 253.1 | 20.1 | <0.5 | <0.5 | 140.6 | 24.7 | 7.6 | <0.5 | <0.5 | <0.5 | 0.7 | <0.5 | <0.5 | <0.5 | 47.7 | 100.7 | 10.3 | 36.7 | 6.5 | 1.8 | 9.5 | 1.0 | 4.5 | 0.9 | 2.9 | <0.5 | 2.8 | <0.5 | 0.7 | 1.1 | 0.6 | 7.1 | 20.0 | 0.9 | 25 | 25 | 39 | 107 | 62 | 1481 | 48 | | |
| 90 | KTBH-2/S-02 | 14.7 | <0.5 | <5 | 18.9 | 219.6 | 20.2 | <0.5 | <0.5 | 151.7 | 33.2 | 8.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 57.9 | 117.2 | 12.0 | 42.3 | 7.9 | 2.3 | 12.0 | 1.2 | 5.9 | 1.2 | 3.6 | <0.5 | 3.4 | <0.5 | 1.2 | 2.0 | <0.5 | <0.5 | 22.3 | 1.0 | 21 | 30 | 29 | 128 | 74 | 1241 | 50 | | |
| 91 | KTBH-2/S-03 | 12.4 | <0.5 | <5 | 15.6 | 224.5 | 18.8 | <0.5 | <0.5 | 125.6 | 33.8 | 5.2 | <0.5 | <0.5 | <0.5 | 1.3 | <0.5 | <0.5 | <0.5 | 61.7 | 121.7 | 11.9 | 42.9 | 7.5 | 2.4 | 10.8 | 1.1 | 5.5 | 1.2 | 3.6 | 0.5 | 3.3 | 0.5 | 1.2 | 1.3 | <0.5 | <0.5 | 20.2 | 0.7 | 22 | 29 | 32 | 184 | 63 | 1204 | 41 | | |
| 92 | KTBH-2/S-04 | 16.9 | <0.5 | <5 | 11.6 | 215.0 | 16.7 | <0.5 | <0.5 | 133.3 | 26.0 | 2.6 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 50.8 | 92.3 | 8.9 | 29.9 | 5.3 | 2.3 | 8.6 | 0.9 | 4.3 | 0.9 | 2.9 | <0.5 | 2.8 | <0.5 | 0.8 | 0.7 | <0.5 | <0.5 | 10.5 | <0.5 | 24 | 21 | 27 | 205 | 48 | 1199 | 31 | | |
| 93 | KTBH-2/S-05 | 13.0 | <0.5 | <5 | 16.9 | 286.5 | 16.7 | <0.5 | <0.5 | 110.4 | 37.0 | 3.5 | <0.5 | <0.5 | <0.5 | 1.9 | <0.5 | <0.5 | <0.5 | 49.9 | 96.9 | 9.6 | 33.6 | 6.4 | 1.9 | 9.8 | 1.1 | 5.7 | 1.2 | 3.9 | 0.6 | 3.9 | 0.6 | 2.2 | 0.8 | <0.5 | <0.5 | 14.1 | 0.8 | 32 | 32 | 25 | 173 | 68 | 1599 | 43 | | |
| 94 | KTBH-2/S-06 | 18.6 | <0.5 | <5 | 21.4 | 218.9 | 19.2 | <0.5 | <0.5 | 124.5 | 41.4 | 4.7 | <0.5 | <0.5 | <0.5 | 1.9 | <0.5 | <0.5 | <0.5 | 56.5 | 111.9 | 11.4 | 40.6 | 8.2 | 1.9 | 11.8 | 1.4 | 6.9 | 1.4 | 4.3 | 0.6 | 4.1 | 0.7 | 0.7 | 0.9 | <0.5 | 3.6 | 20.4 | 1.0 | 21 | 29 | 25 | 119 | 80 | 1214 | 43 | | |

| Annexure XII Analytical report of minor and trace elements (in ppm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------|------|------|----|------|-------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|-------|------|------|-----|-----|------|-----|-----|-----|-----|------|-----|------|------|-----|------|------|------|------|----|----|----|-----|----|------|----|
| SL. NO | SAMPLE NUMBER | Li | Be | B | Sc | Co | Ga | Ge | Se | Rb | Y | Nb | Mo | Cd | In | Sn | Sb | Te | Cs | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Hf | Ta | Tl | Bi | Th | U | Cu | Ni | Pb | Sr | Zn | W | Zr |
| 95 | KTBH-2/S-07 | 10.2 | <0.5 | <5 | 22.1 | 204.0 | 17.6 | <0.5 | <0.5 | 147.0 | 33.2 | 6.1 | 0.6 | 0.9 | <0.5 | 5.3 | <0.5 | <0.5 | <0.5 | 50.4 | 98.1 | 9.9 | 35.5 | 7.0 | 2.2 | 9.9 | 1.2 | 5.8 | 1.2 | 3.6 | 0.6 | 3.4 | 0.5 | 11.5 | 1.0 | <0.5 | <0.5 | 18.4 | 1.0 | 33 | 34 | 27 | 125 | 66 | 1063 | 42 |
| 96 | KTBH-2/S-08 | 6.2 | <0.5 | <5 | 17.8 | 229.1 | 19.3 | <0.5 | <0.5 | 144.6 | 35.1 | 5.6 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 55.7 | 111.3 | 11.5 | 41.0 | 7.8 | 2.2 | 11.2 | 1.2 | 6.2 | 1.3 | 3.8 | 0.6 | 4.0 | 0.6 | 0.6 | 1.1 | <0.5 | <0.5 | 20.1 | 0.9 | 38 | 32 | 25 | 141 | 69 | 1281 | 39 |
| 97 | KTBH-2/S-09 | 7.9 | <0.5 | <5 | 13.1 | 238.7 | 16.5 | <0.5 | <0.5 | 141.6 | 27.3 | 4.6 | <0.5 | <0.5 | <0.5 | 1.2 | <0.5 | <0.5 | <0.5 | 41.3 | 76.0 | 7.4 | 25.5 | 5.6 | 2.1 | 8.2 | 0.9 | 4.8 | 1.0 | 2.9 | <0.5 | 2.7 | <0.5 | 1.0 | 1.0 | <0.5 | <0.5 | 11.5 | 0.5 | 27 | 29 | 26 | 145 | 55 | 1371 | 28 |
| 98 | KTBH-2/S-10 | 10.6 | <0.5 | <5 | 12.3 | 183.4 | 11.7 | <0.5 | <0.5 | 120.7 | 27.8 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 47.2 | 84.3 | 8.2 | 28.2 | 5.1 | 1.5 | 5.8 | 0.7 | 4.9 | 0.9 | 3.3 | <0.5 | 3.0 | <0.5 | 2.2 | 4.3 | <0.5 | <0.5 | 14.5 | <0.5 | 26 | 26 | 33 | 177 | 42 | 981 | 33 |
| 99 | KTBH-2/S-11 | 7.3 | <0.5 | <5 | 10.8 | 220.3 | 17.0 | <0.5 | <0.5 | 138.3 | 24.9 | 4.9 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 47.5 | 89.5 | 8.8 | 29.9 | 5.7 | 2.2 | 8.4 | 0.9 | 4.0 | 0.8 | 2.7 | <0.5 | 2.6 | <0.5 | 0.9 | 0.8 | <0.5 | <0.5 | 14.5 | 0.7 | 32 | 30 | 35 | 165 | 46 | 1309 | 37 |
| 100 | KTBH-2/S-12 | 19.7 | 0.6 | <5 | 9.9 | 235.7 | 17.1 | <0.5 | <0.5 | 101.9 | 22.1 | 3.7 | <0.5 | <0.5 | <0.5 | 1.0 | <0.5 | <0.5 | <0.5 | 47.3 | 91.6 | 9.3 | 32.0 | 5.6 | 1.9 | 8.4 | 0.8 | 4.0 | 0.8 | 2.2 | <0.5 | 2.2 | <0.5 | 1.3 | 0.9 | <0.5 | <0.5 | 15.3 | 1.1 | 29 | 26 | 23 | 157 | 48 | 1379 | 49 |
| 101 | KTBH-2/S-13 | 10.7 | 0.5 | <5 | 15.6 | 235.9 | 17.9 | <0.5 | <0.5 | 120.1 | 29.6 | 4.9 | <0.5 | <0.5 | <0.5 | <0.5 | 1.3 | <0.5 | <0.5 | 57.7 | 109.9 | 10.9 | 38.5 | 6.9 | 2.2 | 10.3 | 1.0 | 4.8 | 1.0 | 3.2 | <0.5 | 3.1 | <0.5 | 1.2 | 0.8 | 1.5 | <0.5 | 17.8 | 1.0 | <5 | <5 | <5 | <5 | <5 | <50 | <5 |
| 102 | KTBH-2/S-14 | 13.5 | <0.5 | <5 | 16.1 | 206.3 | 18.6 | <0.5 | <0.5 | 132.4 | 30.6 | 7.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 57.3 | 111.1 | 11.3 | 39.3 | 7.3 | 2.3 | 11.3 | 1.2 | 5.3 | 1.1 | 3.3 | <0.5 | 2.9 | <0.5 | 0.6 | 1.5 | <0.5 | <0.5 | 20.6 | 0.8 | 28 | 31 | 29 | 144 | 64 | 1174 | 35 |
| 103 | KTBH-2/S-15 | 16.4 | <0.5 | <5 | 14.9 | 235.3 | 20.9 | <0.5 | <0.5 | 164.3 | 27.1 | 7.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 63.2 | 124.0 | 12.5 | 43.7 | 7.4 | 2.4 | 11.7 | 1.1 | 5.1 | 1.0 | 3.0 | <0.5 | 2.7 | <0.5 | 0.6 | 1.1 | 0.5 | <0.5 | 23.8 | 0.9 | 25 | 17 | 30 | 127 | 61 | 1321 | 39 |
| 104 | KTBH-2/S-16 | 10.7 | <0.5 | <5 | 13.8 | 238.5 | 19.9 | <0.5 | <0.5 | 150.0 | 27.4 | 5.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 56.7 | 110.8 | 11.2 | 39.9 | 7.1 | 2.3 | 11.2 | 1.1 | 4.9 | 1.0 | 2.9 | <0.5 | 2.9 | <0.5 | <0.5 | 0.9 | <0.5 | <0.5 | 21.7 | 0.9 | 16 | 28 | 29 | 113 | 69 | 1332 | 42 |
| 105 | KTBH-2/S-17 | 9.6 | <0.5 | <5 | 14.3 | 190.8 | 16.5 | <0.5 | 0.7 | 159.3 | 25.7 | 5.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 46.7 | 83.9 | 8.0 | 27.9 | 6.0 | 2.2 | 9.2 | 1.0 | 4.5 | 0.9 | 2.8 | <0.5 | 2.4 | <0.5 | 2.2 | 3.2 | 0.5 | 0.8 | 15.5 | 0.7 | 13 | 20 | 33 | 139 | 56 | 1171 | 34 |
| 106 | KTBH-2/S-18 | 6.2 | <0.5 | <5 | 16.9 | 200.8 | 20.5 | <0.5 | <0.5 | 119.9 | 29.7 | 8.0 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 63.4 | 134.0 | 14.2 | 50.4 | 9.1 | 2.1 | 13.7 | 1.3 | 5.7 | 1.1 | 3.3 | <0.5 | 3.2 | <0.5 | 0.6 | 1.5 | <0.5 | <0.5 | 29.4 | 1.2 | 30 | 31 | 27 | 109 | 72 | 1209 | 52 |
| 107 | KTBH-2/S-19 | 6.2 | <0.5 | <5 | 16.5 | 191.2 | 19.6 | <0.5 | <0.5 | 142.6 | 29.6 | 10.8 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 56.2 | 114.9 | 11.8 | 42.7 | 7.5 | 2.2 | 11.6 | 1.2 | 5.4 | 1.1 | 3.2 | <0.5 | 3.1 | 0.5 | 1.2 | 2.2 | 0.5 | <0.5 | 22.6 | 1.0 | 21 | 29 | 30 | 132 | 64 | 1125 | 41 |
| 108 | KTBH-2/S-20 | 9.6 | <0.5 | <5 | 15.4 | 197.6 | 18.7 | <0.5 | <0.5 | 143.0 | 28.3 | 7.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 57.6 | 110.1 | 11.0 | 39.1 | 7.4 | 2.3 | 11.1 | 1.1 | 5.1 | 1.0 | 3.2 | <0.5 | 3.0 | <0.5 | 0.6 | 1.4 | <0.5 | <0.5 | 16.1 | 0.9 | 30 | 31 | 30 | 126 | 66 | 1158 | 41 |
| 109 | KTBH-2/S-21 | 11.3 | <0.5 | <5 | 21.0 | 189.3 | 19.4 | <0.5 | <0.5 | 138.1 | 36.2 | 8.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.6 | 48.2 | 92.0 | 9.4 | 34.6 | 7.9 | 2.2 | 11.4 | 1.4 | 7.0 | 1.3 | 4.0 | 0.6 | 3.8 | 0.6 | 1.6 | 2.0 | <0.5 | <0.5 | 14.7 | 1.2 | 62 | 40 | 32 | 109 | 86 | 1122 | 69 |
| 110 | KTBH-2/S-22 | 3.2 | <0.5 | <5 | 16.5 | 182.3 | 19.7 | <0.5 | <0.5 | 156.6 | 30.3 | 8.8 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 54.4 | 105.3 | 10.4 | 36.8 | 6.9 | 2.5 | 10.9 | 1.2 | 5.7 | 1.1 | 3.5 | 0.5 | 3.2 | <0.5 | 1.5 | 1.2 | 0.5 | <0.5 | 17.0 | 0.9 | 63 | 31 | 32 | 100 | 66 | 1087 | 32 |
| 111 | KTBH-2/S-23 | 6.2 | <0.5 | <5 | 20.7 | 179.5 | 19.0 | <0.5 | <0.5 | 137.3 | 39.1 | 8.3 | 1.0 | <0.5 | <0.5 | 2.9 | 2.5 | <0.5 | <0.5 | 55.0 | 107.1 | 10.9 | 39.4 | 8.4 | 2.1 | 12.7 | 1.3 | 7.1 | 1.4 | 4.3 | 0.6 | 4.1 | 0.6 | 3.1 | 1.2 | 1.6 | <0.5 | 19.9 | 0.8 | 67 | 47 | 31 | 97 | 84 | 1038 | 35 |
| 112 | KTBH-2/S-24 | 7.3 | <0.5 | <5 | 16.0 | 181.6 | 17.3 | <0.5 | <0.5 | 160.6 | 31.6 | 5.8 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 61.4 | 114.5 | 11.1 | 39.3 | 7.1 | 2.4 | 12.1 | 1.2 | 5.6 | 1.2 | 3.5 | 0.5 | 3.5 | 0.6 | <0.5 | 1.1 | 0.6 | <0.5 | 17.8 | 0.9 | 22 | 21 | 33 | 131 | 56 | 1078 | 43 |
| 113 | KTBH-2/S-25 | 5.6 | <0.5 | <5 | 18.4 | 199.3 | 19.3 | <0.5 | <0.5 | 128.7 | 34.9 | 8.9 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 59.1 | 120.7 | 12.5 | 44.5 | 8.5 | 2.3 | 12.9 | 1.3 | 6.5 | 1.3 | 3.9 | 0.6 | 3.8 | 0.5 | 0.9 | 1.5 | <0.5 | 1.7 | 21.7 | 0.9 | 44 | 36 | 26 | 94 | 75 | 1147 | 51 |
| 114 | KTBH-2/S-26 | 6.4 | <0.5 | <5 | 18.8 | 220.4 | 13.5 | 0.5 | <0.5 | 128.1 | 35.0 | 6.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 73.1 | 147.3 | 15.2 | 54.5 | 9.5 | 1.8 | 9.2 | 1.2 | 6.6 | 1.2 | 4.3 | <0.5 | 4.1 | 0.5 | 2.6 | 6.2 | <0.5 | <0.5 | 36.8 | 0.9 | 39 | 34 | 21 | 110 | 64 | 1122 | 13 |
| 115 | KTBH-2/S-27 | 5.1 | <0.5 | <5 | 16.7 | 201.2 | 18.5 | <0.5 | <0.5 | 140.1 | 29.5 | 6.0 | 0.9 | 0.5 | <0.5 | <0.5 | 2.5 | <0.5 | <0.5 | 59.0 | 120.2 | 12.7 | 45.0 | 8.2 | 2.1 | 12.5 | 1.2 | 5.4 | 1.1 | 3.3 | <0.5 | 3.2 | <0.5 | 5.9 | 0.8 | <0.5 | <0.5 | 23.6 | 0.9 | 19 | 26 | 29 | 114 | 68 | 1175 | 43 |
| 116 | KTBH-2/S-28 | 6.2 | <0.5 | <5 | 11.8 | 217.9 | 17.7 | <0.5 | <0.5 | 167.2 | 21.3 | 7.3 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 60.3 | 120.3 | 12.2 | 42.2 | 7.7 | 2.3 | 12.3 | 1.1 | 4.3 | 0.8 | 2.5 | <0.5 | 2.1 | <0.5 | 0.5 | 3.0 | 0.5 | <0.5 | 23.8 | 0.9 | <5 | 12 | 34 | 129 | 54 | 1375 | 50 |
| 117 | KTBH-2/S-29 | 5.6 | <0.5 | <5 | 12.5 | 195.3 | 16.9 | <0.5 | <0.5 | 195.7 | 25.7 | 6.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.6 | 54.1 | 105.2 | 10.8 | 37.1 | 7.0 | 2.7 | 11.4 | 1.1 | 4.5 | 0.9 | 2.9 | <0.5 | 2.7 | <0.5 | 0.6 | 1.4 | 0.6 | <0.5 | 19.7 | 0.8 | 17 | 19 | 40 | 156 | 54 | 1284 | 33 |
| 118 | KTBH- | 3.9 | <0.5 | <5 | 17.9 | 229.8 | 19.8 | <0.5 | <0.5 | 149.5 | 35.9 | 9.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 65.1 | 132.8 | 13.8 | 49.4 | 9.3 | 2.3 | 14.0 | 1.4 | 6.7 | 1.4 | 4.1 | 0.6 | 3.5 | 0.6 | 0.7 | 1.5 | <0.5 | <0.5 | 24.4 | 1.0 | 41 | 33 | 27 | 108 | 76 | 1396 | 40 |

| Annexure XII Analytical report of minor and trace elements (in ppm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------|------|------|------|------|-------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|-------|------|------|-----|-----|------|-----|-----|-----|-----|------|-----|------|------|------|------|------|------|------|-----|-----|----|-----|-----|------|----|--|--|
| SL. NO | SAMPLE NUMBER | Li | Be | B | Sc | Co | Ga | Ge | Se | Rb | Y | Nb | Mo | Cd | In | Sn | Sb | Te | Cs | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Hf | Ta | Tl | Bi | Th | U | Cu | Ni | Pb | Sr | Zn | W | Zr | | |
| | 2/S-30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 119 | KTBH-2/S-31 | 3.9 | <0.5 | <5 | 14.8 | 204.8 | 14.7 | <0.5 | <0.5 | 109.1 | 28.0 | 4.3 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 50.8 | 95.1 | 9.7 | 34.2 | 6.9 | 1.9 | 10.6 | 1.1 | 5.1 | 1.0 | 3.2 | <0.5 | 3.0 | <0.5 | 0.6 | 0.9 | <0.5 | <0.5 | 16.2 | 0.6 | 29 | 39 | 24 | 103 | 64 | 1274 | 51 | | |
| 120 | KTBH-2/S-32 | 8.2 | <0.5 | <5 | 13.0 | 240.7 | 13.1 | <0.5 | <0.5 | 121.1 | 27.1 | 2.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 38.8 | 67.6 | 6.5 | 22.1 | 4.2 | 2.1 | 7.4 | 0.9 | 4.6 | 0.9 | 2.9 | <0.5 | 3.0 | <0.5 | 1.9 | 0.8 | <0.5 | <0.5 | 8.1 | <0.5 | 23 | 34 | 35 | 148 | 45 | 1454 | 48 | | |
| 121 | KTBH-2/S-33 | 9.0 | <0.5 | 11.8 | 14.1 | 261.2 | 17.3 | <0.5 | 1.1 | 117.6 | 27.8 | 4.3 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 51.5 | 93.4 | 9.4 | 32.4 | 6.3 | 2.2 | 10.1 | 1.1 | 5.0 | 1.0 | 3.0 | <0.5 | 2.8 | <0.5 | <0.5 | 0.9 | <0.5 | <0.5 | 14.6 | 0.6 | 69 | 48 | 32 | 168 | 58 | 1555 | 38 | | |
| 122 | KTBH-2/S-34 | 19.2 | 0.8 | <5 | 15.4 | 230.4 | 18.2 | <0.5 | <0.5 | 108.5 | 33.3 | 10.4 | 0.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | 53.9 | 94.4 | 9.6 | 33.1 | 5.9 | 3.1 | 10.2 | 1.2 | 6.0 | 1.1 | 3.1 | <0.5 | 2.6 | <0.5 | 0.6 | 1.8 | <0.5 | 1.8 | 9.7 | 0.5 | 102 | 69 | 25 | 404 | 43 | 1231 | 37 | | |
| 123 | KTBH-2/S-35 | 14.1 | <0.5 | <5 | 11.6 | 271.7 | 15.6 | <0.5 | 1.2 | 160.2 | 28.2 | 1.0 | 5.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 50.0 | 106.0 | 12.0 | 44.6 | 8.2 | 2.7 | 11.7 | 1.1 | 5.0 | 1.0 | 3.0 | <0.5 | 2.7 | <0.5 | <0.5 | <0.5 | 0.6 | <0.5 | 16.4 | 0.6 | 148 | 88 | 25 | 165 | 74 | 1394 | 20 | | |
| 124 | KTBH-2/S-36 | 18.0 | 1.4 | <5 | 10.4 | 195.5 | 13.4 | <0.5 | 1.6 | 67.9 | 23.2 | 2.8 | 5.1 | 1.1 | <0.5 | <0.5 | 16.3 | <0.5 | <0.5 | 32.3 | 61.7 | 7.3 | 28.4 | 5.4 | 1.9 | 7.6 | 0.8 | 3.8 | 0.8 | 2.5 | <0.5 | 2.4 | <0.5 | 0.6 | 0.6 | 3.1 | <0.5 | 6.6 | 0.9 | 219 | 87 | 17 | 157 | 115 | 868 | 29 | | |
| 125 | KTBH-2/S-37 | 18.6 | 1.3 | <5 | 5.8 | 293.9 | 10.0 | <0.5 | 3.0 | 28.3 | 19.4 | <0.5 | 8.2 | 0.9 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 31.0 | 59.8 | 7.7 | 30.5 | 5.7 | 1.5 | 7.7 | 0.8 | 3.2 | 0.6 | 1.9 | <0.5 | 1.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 4.7 | <0.5 | 246 | 98 | 12 | 140 | 160 | 1077 | 13 | | |
| 126 | KTBH-2/S-38 | 19.7 | 0.9 | <5 | 12.3 | 163.7 | 8.4 | <0.5 | 4.6 | 11.0 | 27.7 | 2.3 | 10.2 | 0.9 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 18.6 | 36.0 | 4.5 | 19.3 | 4.0 | 1.4 | 5.3 | 0.7 | 4.0 | 0.9 | 3.0 | <0.5 | 2.8 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 2.0 | <0.5 | 272 | 104 | 13 | 68 | 134 | 737 | 14 | | |
| 127 | KTBH-3/S-01 | 3.9 | <0.5 | <5 | 14.1 | 251.1 | 19.9 | <0.5 | <0.5 | 132.9 | 30.0 | 4.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 42.8 | 81.9 | 8.3 | 29.0 | 6.3 | 2.1 | 10.2 | 1.1 | 5.5 | 1.1 | 3.2 | <0.5 | 2.9 | <0.5 | 1.0 | 1.9 | <0.5 | <0.5 | 16.7 | 0.8 | 21 | 37 | 27 | 135 | 74 | 1740 | 51 | | |
| 128 | KTBH-3/S-02 | 10.2 | <0.5 | <5 | 13.3 | 207.1 | 15.4 | <0.5 | <0.5 | 134.1 | 25.9 | 4.0 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | <0.5 | 0.5 | 44.2 | 83.0 | 8.2 | 29.6 | 5.5 | 2.2 | 9.4 | 1.0 | 4.8 | 0.9 | 2.8 | <0.5 | 2.7 | <0.5 | 0.7 | 0.8 | <0.5 | <0.5 | 12.9 | 0.7 | 24 | 32 | 24 | 172 | 68 | 1385 | 46 | | |
| 129 | KTBH-3/S-03 | 12.4 | <0.5 | <5 | 17.0 | 244.4 | 17.4 | <0.5 | 2.7 | 132.1 | 29.8 | 5.3 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 40.3 | 79.4 | 7.8 | 27.4 | 6.2 | 2.1 | 9.7 | 1.0 | 5.4 | 1.1 | 3.1 | <0.5 | 3.0 | <0.5 | 1.8 | 2.8 | 0.5 | 7.1 | 13.3 | 0.5 | 24 | 31 | 24 | 119 | 73 | 1569 | 35 | | |
| 130 | KTBH-3/S-04 | 7.6 | <0.5 | <5 | 15.0 | 215.1 | 17.6 | <0.5 | 3.3 | 127.1 | 31.6 | 5.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 51.0 | 99.6 | 10.1 | 36.3 | 7.4 | 2.2 | 11.1 | 1.2 | 5.6 | 1.1 | 3.4 | <0.5 | 3.3 | <0.5 | 0.6 | 1.0 | <0.5 | <0.5 | 17.5 | 0.7 | 32 | 32 | 24 | 135 | 74 | 1338 | 46 | | |
| 131 | KTBH-3/S-05 | 11.3 | <0.5 | <5 | 21.1 | 251.8 | 19.5 | <0.5 | 3.9 | 114.0 | 38.1 | 11.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 70.4 | 145.8 | 15.1 | 54.1 | 9.5 | 2.2 | 15.2 | 1.5 | 6.9 | 1.4 | 4.4 | 0.6 | 4.1 | 0.6 | 2.7 | 1.9 | <0.5 | 2.0 | 27.2 | 1.1 | 54 | 44 | 22 | 94 | 84 | 1582 | 42 | | |
| 132 | KTBH-3/S-06 | 4.5 | <0.5 | <5 | 20.0 | 212.9 | 18.9 | <0.5 | 4.0 | 131.2 | 36.8 | 10.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 63.4 | 133.0 | 14.1 | 50.7 | 9.0 | 2.3 | 13.8 | 1.4 | 6.5 | 1.3 | 4.3 | 0.6 | 4.0 | 0.6 | 1.3 | 2.4 | <0.5 | <0.5 | 26.9 | 0.8 | 50 | 43 | 27 | 117 | 79 | 1347 | 36 | | |
| 133 | KTBH-3/S-07 | 7.9 | <0.5 | <5 | 13.0 | 226.1 | 16.3 | <0.5 | 3.9 | 174.9 | 27.6 | 5.9 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 55.7 | 109.8 | 11.3 | 40.1 | 7.4 | 2.6 | 11.3 | 1.1 | 5.2 | 1.0 | 3.0 | <0.5 | 2.7 | <0.5 | 1.2 | 1.0 | 0.5 | <0.5 | 22.9 | 0.7 | 16 | 23 | 45 | 150 | 60 | 1419 | 58 | | |
| 134 | KTBH-3/S-08 | 3.4 | <0.5 | <5 | 17.3 | 208.5 | 19.9 | <0.5 | 4.9 | 140.0 | 33.9 | 11.5 | 0.9 | <0.5 | <0.5 | 36.8 | 2.8 | <0.5 | <0.5 | 64.9 | 135.3 | 14.1 | 51.3 | 8.9 | 2.3 | 13.7 | 1.4 | 6.3 | 1.3 | 4.0 | 0.5 | 3.7 | 0.6 | <0.5 | 2.2 | 0.6 | 43.6 | 27.2 | 1.0 | 39 | 39 | 30 | 115 | 73 | 1284 | 41 | | |
| 135 | KTBH-3/S-09 | 5.1 | <0.5 | <5 | 19.3 | 262.7 | 18.3 | <0.5 | 3.3 | 115.0 | 37.5 | 9.7 | <0.5 | <0.5 | <0.5 | <0.5 | 10.5 | <0.5 | <0.5 | 50.2 | 98.3 | 10.2 | 36.0 | 7.2 | 2.2 | 11.6 | 1.3 | 6.7 | 1.4 | 4.1 | 0.6 | 4.0 | 0.6 | 0.6 | 1.6 | 0.7 | <0.5 | 17.3 | 0.7 | 52 | 50 | 22 | 104 | 80 | 1726 | 48 | | |
| 136 | KTBH-3/S-10 | 21.9 | 0.9 | <5 | 18.9 | 201.2 | 17.2 | <0.5 | <0.5 | 90.3 | 35.0 | 2.3 | 0.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.7 | 31.1 | 58.0 | 6.3 | 22.8 | 4.1 | 1.8 | 4.8 | 0.7 | 5.6 | 1.2 | 4.0 | 0.5 | 4.0 | <0.5 | 2.8 | 3.4 | <0.5 | <0.5 | 6.2 | <0.5 | 35 | 93 | 9 | 215 | 131 | 1102 | 7 | | |
| 137 | KTBH-3/S-11 | 23.7 | 1.1 | <5 | 14.5 | 188.9 | 14.0 | <0.5 | 5.4 | 61.9 | 28.0 | 2.3 | 3.7 | 0.6 | <0.5 | <0.5 | <0.5 | <0.5 | 0.7 | 34.1 | 68.8 | 7.9 | 29.7 | 5.9 | 1.9 | 8.5 | 0.9 | 4.5 | 1.0 | 2.9 | <0.5 | 2.7 | <0.5 | 0.6 | <0.5 | <0.5 | <0.5 | 7.4 | 0.7 | 148 | 81 | 15 | 155 | 188 | 881 | 29 | | |
| 138 | KTBH-3/S-12 | 13.0 | 1.0 | <5 | 13.2 | 169.3 | 12.0 | <0.5 | 6.7 | 42.0 | 27.6 | 0.8 | 3.4 | 0.6 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 30.4 | 56.7 | 6.5 | 24.9 | 4.4 | 2.0 | 7.0 | 0.8 | 3.9 | 0.9 | 2.7 | <0.5 | 2.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 6.0 | 0.6 | 130 | 57 | 17 | 142 | 216 | 759 | 24 | | |
| 139 | KTBH-3/S-13 | 20.9 | 1.7 | <5 | 13.9 | 104.8 | 11.9 | <0.5 | 7.1 | 32.3 | 26.9 | 1.8 | 6.1 | 1.0 | <0.5 | <0.5 | <0.5 | <0.5 | 0.9 | 34.2 | 66.5 | 7.8 | 29.4 | 5.5 | 1.4 | 8.2 | 0.8 | 4.0 | 0.9 | 3.0 | <0.5 | 2.9 | <0.5 | <0.5 | 0.5 | <0.5 | <0.5 | 8.0 | 1.3 | 166 | 77 | 18 | 47 | 550 | 538 | 31 | | |
| 140 | KTBH-3/S-14 | 24.0 | 1.9 | <5 | 5.6 | 196.5 | 11.3 | <0.5 | <0.5 | 73.8 | 26.6 | <0.5 | 10.0 | 1.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | 32.8 | 61.6 | 8.1 | 32.9 | 6.7 | 1.7 | 6.8 | 0.9 | 5.1 | 0.9 | 2.7 | <0.5 | 2.0 | <0.5 | 0.7 | 2.6 | <0.5 | <0.5 | 8.1 | 1.5 | 295 | 114 | 24 | 90 | 165 | 857 | 11 | | |
| 141 | KTBH-3/S-15 | 14.7 | 0.7 | <5 | 23.3 | 214.1 | 15.8 | <0.5 | 9.3 | 18.0 | 43.0 | 3.8 | 5.1 | 0.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 20.9 | 43.2 | 5.4 | 22.7 | 5.2 | 2.3 | 8.0 | 1.1 | 6.5 | 1.4 | 4.4 | 0.7 | 4.3 | 0.7 | 0.5 | 0.7 | <0.5 | 4.5 | 0.9 | <0.5 | 144 | 56 | 11 | 149 | 265 | 1120 | 22 | | |

| Annexure XII Analytical report of minor and trace elements (in ppm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------|------|------|----|------|-------|------|------|------|-------|------|-----|-----|------|------|------|------|------|------|------|-------|------|------|-----|-----|-----|-----|-----|-----|-----|------|-----|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|------|----|
| SL. NO | SAMPLE NUMBER | Li | Be | B | Sc | Co | Ga | Ge | Se | Rb | Y | Nb | Mo | Cd | In | Sn | Sb | Te | Cs | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Hf | Ta | Ti | Bi | Th | U | Cu | Ni | Pb | Sr | Zn | W | Zr |
| 142 | KABH-2/S-10 | 18.0 | 1.5 | <5 | 13.0 | 179.9 | 16.1 | <0.5 | <0.5 | 119.3 | 27.0 | 1.2 | 4.9 | 3.3 | <0.5 | <0.5 | <0.5 | <0.5 | 1.0 | 41.2 | 83.0 | 8.5 | 30.1 | 5.7 | 1.4 | 5.3 | 0.8 | 4.3 | 0.8 | 2.7 | <0.5 | 2.5 | <0.5 | <0.5 | <0.5 | 2.0 | <0.5 | 10.4 | 0.6 | 38 | 36 | 220 | 103 | 194 | 579 | 12 |
| 143 | KABH-2/S-11 | 5.2 | <0.5 | <5 | 10.0 | 229.2 | 15.9 | <0.5 | 0.8 | 135.6 | 30.1 | 2.3 | 1.8 | 1.0 | <0.5 | 0.6 | 1.1 | 1.5 | <0.5 | 62.3 | 114.0 | 11.9 | 41.9 | 7.1 | 1.7 | 7.5 | 1.0 | 6.0 | 1.2 | 3.6 | <0.5 | 3.4 | 0.5 | 19.2 | 2.3 | <0.5 | 0.7 | 23.7 | 1.2 | 64 | 45 | 34 | 92 | 35 | 927 | 50 |
| 144 | KABH-2/S-12 | 5.8 | <0.5 | <5 | 8.4 | 252.2 | 15.0 | <0.5 | 1.1 | 107.2 | 26.1 | 1.9 | 0.6 | <0.5 | <0.5 | <0.5 | <0.5 | 0.7 | <0.5 | 61.5 | 107.5 | 11.3 | 39.1 | 6.6 | 1.6 | 7.4 | 1.1 | 5.6 | 1.0 | 2.9 | <0.5 | 2.5 | <0.5 | 2.5 | 2.2 | <0.5 | 0.9 | 16.1 | 0.6 | 41 | 37 | 26 | 92 | 32 | 1095 | 55 |
| 145 | KABH-2/S-13 | 5.8 | 0.6 | <5 | 8.2 | 175.4 | 15.0 | <0.5 | 1.8 | 117.2 | 28.3 | 1.6 | 1.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 48.2 | 94.7 | 9.6 | 34.2 | 5.9 | 1.6 | 6.6 | 0.9 | 5.4 | 1.1 | 3.3 | <0.5 | 3.0 | <0.5 | 3.2 | 1.2 | <0.5 | 0.8 | 16.3 | 1.4 | 75 | 58 | 28 | 92 | 27 | 771 | 64 |
| 146 | KABH-2/S-14 | 7.6 | <0.5 | <5 | 8.9 | 143.5 | 14.4 | <0.5 | 0.8 | 129.9 | 32.9 | 0.8 | 1.6 | <0.5 | 5.8 | <0.5 | <0.5 | <0.5 | <0.5 | 60.1 | 122.8 | 12.7 | 45.9 | 8.2 | 1.7 | 8.6 | 1.2 | 6.4 | 1.3 | 3.8 | <0.5 | 3.3 | 0.5 | 1.5 | 0.6 | <0.5 | 0.9 | 23.7 | 1.2 | 77 | 77 | 27 | 81 | 44 | 621 | 40 |
| 147 | KABH-2/S-15 | 9.0 | 0.7 | <5 | 13.5 | 170.8 | 17.3 | <0.5 | <0.5 | 163.6 | 30.4 | 0.8 | 1.9 | 18.6 | <0.5 | <0.5 | <0.5 | <0.5 | 0.6 | 57.0 | 103.9 | 10.9 | 37.1 | 6.5 | 1.6 | 6.6 | 0.9 | 5.1 | 1.0 | 3.0 | <0.5 | 2.8 | <0.5 | 0.5 | <0.5 | 3.5 | <0.5 | 16.3 | 0.8 | 81 | 56 | 789 | 111 | 79 | 766 | 11 |
| 148 | KABH-1/S-1 | 13.2 | 0.6 | <5 | 27.8 | 297.9 | 18.0 | <0.5 | 1.7 | 32.8 | 30.5 | 1.9 | 3.4 | <0.5 | <0.5 | <0.5 | 1.1 | 1.7 | <0.5 | 32.5 | 64.0 | 6.9 | 25.8 | 5.2 | 1.6 | 6.3 | 1.0 | 6.2 | 1.3 | 3.6 | 0.6 | 3.6 | 0.5 | 1.5 | 1.3 | <0.5 | 1.1 | 8.5 | 0.5 | 194 | 100 | 7 | 117 | 96 | 1228 | 31 |
| 149 | KABH-1/S-2 | 17.1 | <0.5 | <5 | 36.2 | 294.8 | 19.7 | <0.5 | 1.1 | 50.0 | 34.6 | 5.2 | 8.7 | 14.9 | <0.5 | <0.5 | 6.5 | 3.1 | <0.5 | 34.9 | 65.7 | 7.0 | 25.4 | 4.8 | 1.5 | 5.7 | 0.9 | 5.8 | 1.2 | 3.7 | 0.5 | 3.6 | 0.5 | 2.9 | 3.8 | 1.7 | <0.5 | 6.8 | <0.5 | 299 | 159 | 752 | 119 | 129 | 1026 | 14 |
| 150 | KABH-1/S-3 | 7.6 | <0.5 | <5 | 24.1 | 290.7 | 17.4 | <0.5 | 2.4 | 89.7 | 45.9 | 5.4 | 0.7 | <0.5 | <0.5 | <0.5 | 1.0 | 0.6 | <0.5 | 57.5 | 121.7 | 12.7 | 46.8 | 8.8 | 1.9 | 9.2 | 1.4 | 8.8 | 1.9 | 5.8 | 0.9 | 5.8 | 0.9 | 4.2 | 1.5 | <0.5 | 1.0 | 20.7 | 1.0 | 97 | 47 | 16 | 134 | 81 | 1233 | 53 |

| ANNEXURE XIII: Bulk density data based on Archimedes' principle | | | | | | | | | | |
|---|-----------------|---------------|---------------------------|-------------------------|-----------------------|-------------------|----------------------------|--------------------|-------------------------------------|------------------------------------|
| SL. NO | BOREHOLE NUMBER | SAMPLE NUMBER | INITIAL WATER HEIGHT (cm) | FINAL WATER HEIGHT (cm) | INCREASED HEIGHT (cm) | WATER WEIGHT (kg) | WATER + SAMPLE WEIGHT (kg) | SAMPLE WEIGHT (gm) | VOLUME OF SAMPLE (cm ³) | BULK DENSITY (gm/cm ³) |
| 1 | KABH-1 | S-1 | 6.3 | 7.7 | 1.4 | 1.019 | 1.355 | 336 | 109.9 | 3.0573 |
| 2 | | S-2 | 6.2 | 8 | 1.8 | 1.017 | 1.448 | 431 | 141.3 | 3.0502 |
| 3 | | S-3 | 6.2 | 7.8 | 1.6 | 1.017 | 1.376 | 359 | 125.6 | 2.8583 |
| 4 | | S-4 | 6.1 | 7.2 | 1.1 | 1.015 | 1.247 | 232 | 86.35 | 2.6867 |
| 5 | KABH-2 | S-1 | 6.6 | 8 | 1.4 | 1.049 | 1.345 | 296 | 109.9 | 2.6934 |
| 6 | | S-2 | 6.6 | 8.5 | 1.9 | 1.046 | 1.44 | 394 | 149.15 | 2.6416 |
| 7 | | S-3 | 6.6 | 8.5 | 1.9 | 1.044 | 1.386 | 342 | 149.15 | 2.2930 |
| 8 | | S-4 | 6.4 | 7.5 | 1.1 | 1.036 | 1.249 | 213 | 86.35 | 2.4667 |
| 9 | | S-5 | 6.4 | 7.7 | 1.3 | 1.034 | 1.272 | 238 | 102.05 | 2.3322 |
| 10 | | S-6 | 6.4 | 7.9 | 1.5 | 1.031 | 1.288 | 257 | 117.75 | 2.1826 |
| 11 | | S-7 | 6.3 | 8.4 | 2.1 | 1.028 | 1.443 | 415 | 164.85 | 2.5174 |
| 12 | | S-8 | 6.3 | 8.5 | 2.2 | 1.024 | 1.429 | 405 | 172.7 | 2.3451 |
| 13 | | S-9 | 6.2 | 7.9 | 1.7 | 1.019 | 1.347 | 328 | 133.45 | 2.4578 |
| 14 | | S-10 | 6.1 | 7.7 | 1.6 | 1.014 | 1.36 | 346 | 125.6 | 2.7548 |

ANNEXURE XIII: Bulk density data based on Archimedes' principle

| SL. NO | BOREHOLE NUMBER | SAMPLE NUMBER | INITIAL WATER HEIGHT (cm) | FINAL WATER HEIGHT (cm) | INCREASED HEIGHT (cm) | WATER WEIGHT (kg) | WATER + SAMPLE WEIGHT (kg) | SAMPLE WEIGHT (gm) | VOLUME OF SAMPLE (cm ³) | BULK DENSITY (gm/cm ³) |
|--------|-----------------|---------------|---------------------------|-------------------------|-----------------------|-------------------|----------------------------|--------------------|-------------------------------------|------------------------------------|
| 15 | | S-11 | 6.1 | 7.3 | 1.2 | 1.012 | 1.237 | 225 | 94.2 | 2.3885 |
| 16 | | S-12 | 6 | 7.3 | 1.3 | 1.01 | 1.262 | 252 | 102.05 | 2.4694 |
| 17 | | S-13 | 6 | 8 | 2 | 1.008 | 1.385 | 377 | 157 | 2.4013 |
| 18 | | S-14 | 6.3 | 8.2 | 1.9 | 1.032 | 1.4 | 368 | 149.15 | 2.4673 |
| 19 | | S-15 | 6.3 | 8 | 1.7 | 1.029 | 1.391 | 362 | 133.45 | 2.7126 |
| 20 | | S-16 | 6.3 | 8.3 | 2 | 1.027 | 1.456 | 429 | 157 | 2.7325 |
| 21 | | S-17 | 6.3 | 7.8 | 1.5 | 1.025 | 1.381 | 356 | 117.75 | 3.0234 |
| 22 | | S-18 | 6.2 | 8.1 | 1.9 | 1.023 | 1.453 | 430 | 149.15 | 2.8830 |
| 23 | | S-19 | 6.2 | 7.9 | 1.7 | 1.022 | 1.388 | 366 | 133.45 | 2.7426 |
| 24 | | S-20 | 6.2 | 7.2 | 1 | 1.02 | 1.214 | 194 | 78.5 | 2.4713 |
| 25 | | S-21 | 6.4 | 8.1 | 1.7 | 1.038 | 1.375 | 337 | 133.45 | 2.5253 |
| 26 | | S-22 | 6.4 | 8 | 1.6 | 1.036 | 1.362 | 326 | 125.6 | 2.5955 |
| 27 | | S-23 | 6.3 | 7.8 | 1.5 | 1.034 | 1.332 | 298 | 117.75 | 2.5308 |
| 28 | | S-24 | 6.3 | 8 | 1.7 | 1.031 | 1.409 | 378 | 133.45 | 2.8325 |
| 29 | KTBH-3 | S-1 | 6.2 | 7.2 | 1 | 1.028 | 1.247 | 219 | 78.5 | 2.7898 |
| 30 | | S-2 | 6.2 | 7.8 | 1.6 | 1.026 | 1.41 | 384 | 125.6 | 3.0573 |
| 31 | | S-3 | 6.1 | 8.2 | 2.1 | 1.024 | 1.477 | 453 | 164.85 | 2.7480 |
| 32 | | S-4 | 6.5 | 8 | 1.5 | 1.051 | 1.372 | 321 | 117.75 | 2.7261 |
| 33 | | S-5 | 6.5 | 8.7 | 2.2 | 1.05 | 1.555 | 505 | 172.7 | 2.9241 |
| 34 | | S-6 | 6.5 | 7.4 | 0.9 | 1.047 | 1.275 | 228 | 70.65 | 3.2272 |
| 35 | | S-7 | 6.4 | 7.4 | 1 | 1.044 | 1.274 | 230 | 78.5 | 2.9299 |
| 36 | | S-8 | 6.4 | 8 | 1.6 | 1.041 | 1.401 | 360 | 125.6 | 2.8662 |
| 37 | | S-9 | 6.3 | 7.8 | 1.5 | 1.039 | 1.389 | 350 | 117.75 | 2.9724 |
| 38 | | S-10 | 6.3 | 7.6 | 1.3 | 1.037 | 1.316 | 279 | 102.05 | 2.7340 |
| 39 | | S-11 | 6.3 | 7.8 | 1.5 | 1.034 | 1.37 | 336 | 117.75 | 2.8535 |
| 40 | | S-12 | 6.2 | 7.5 | 1.3 | 1.031 | 1.28 | 249 | 102.05 | 2.4400 |
| 41 | | S-13 | 6.2 | 7.7 | 1.5 | 1.028 | 1.317 | 289 | 117.75 | 2.4544 |
| 42 | | S-14 | 6.1 | 7.8 | 1.7 | 1.024 | 1.364 | 340 | 133.45 | 2.5478 |
| 43 | | S-15 | 6.1 | 7 | 0.9 | 1.021 | 1.22 | 199 | 70.65 | 2.8167 |
| 44 | KTBH-2 | S-1 | 6.5 | 8.1 | 1.6 | 1.048 | 1.381 | 333 | 125.6 | 2.6513 |
| 45 | | S-2 | 6.5 | 8.5 | 2 | 1.042 | 1.465 | 423 | 157 | 2.6943 |
| 46 | | S-3 | 6.5 | 8.2 | 1.7 | 1.041 | 1.396 | 355 | 133.45 | 2.6602 |
| 47 | | S-4 | 6.4 | 8.5 | 2.1 | 1.037 | 1.453 | 416 | 164.85 | 2.5235 |
| 48 | | S-5 | 6.4 | 8 | 1.6 | 1.035 | 1.368 | 333 | 125.6 | 2.6513 |

ANNEXURE XIII: Bulk density data based on Archimedes' principle

| SL. NO | BOREHOLE NUMBER | SAMPLE NUMBER | INITIAL WATER HEIGHT (cm) | FINAL WATER HEIGHT (cm) | INCREASED HEIGHT (cm) | WATER WEIGHT (kg) | WATER + SAMPLE WEIGHT (kg) | SAMPLE WEIGHT (gm) | VOLUME OF SAMPLE (cm ³) | BULK DENSITY (gm/cm ³) |
|--------|-----------------|---------------|---------------------------|-------------------------|-----------------------|-------------------|----------------------------|--------------------|-------------------------------------|------------------------------------|
| 49 | | S-6 | 6.4 | 7.9 | 1.5 | 1.032 | 1.373 | 341 | 117.75 | 2.8960 |
| 50 | | S-7 | 6.3 | 8.4 | 2.1 | 1.03 | 1.489 | 459 | 164.85 | 2.7843 |
| 51 | | S-8 | 6.3 | 7.2 | 0.9 | 1.028 | 1.219 | 191 | 70.65 | 2.7035 |
| 52 | | S-9 | 6.4 | 7.3 | 0.9 | 1.03 | 1.234 | 204 | 70.65 | 2.8875 |
| 53 | | S-10 | 6.3 | 8.5 | 2.2 | 1.028 | 1.496 | 468 | 172.7 | 2.7099 |
| 54 | | S-11 | 6.3 | 7.8 | 1.5 | 1.026 | 1.342 | 316 | 117.75 | 2.6837 |
| 55 | | S-12 | 6.3 | 7.5 | 1.2 | 1.023 | 1.284 | 261 | 94.2 | 2.7707 |
| 56 | | S-13 | 6.2 | 7.5 | 1.3 | 1.022 | 1.309 | 287 | 102.05 | 2.8123 |
| 57 | | S-14 | 6.2 | 7.7 | 1.5 | 1.02 | 1.347 | 327 | 117.75 | 2.7771 |
| 58 | | S-15 | 6.2 | 8 | 1.8 | 1.018 | 1.425 | 407 | 141.3 | 2.8804 |
| 59 | | S-16 | 6.2 | 7.5 | 1.3 | 1.016 | 1.297 | 281 | 102.05 | 2.7536 |
| 60 | | S-17 | 6.1 | 7.7 | 1.6 | 1.014 | 1.351 | 337 | 125.6 | 2.6831 |
| 61 | | S-18 | 6.1 | 7.5 | 1.4 | 1.012 | 1.314 | 302 | 109.9 | 2.7480 |
| 62 | | S-19 | 6.1 | 7.7 | 1.6 | 1.01 | 1.363 | 353 | 125.6 | 2.8105 |
| 63 | | S-20 | 7 | 8 | 1 | 1.082 | 1.289 | 207 | 78.5 | 2.6369 |
| 64 | | S-21 | 7 | 9.2 | 2.2 | 1.08 | 1.587 | 507 | 172.7 | 2.9357 |
| 65 | | S-22 | 7 | 9.1 | 2.1 | 1.078 | 1.562 | 484 | 164.85 | 2.9360 |
| 66 | | S-23 | 7 | 8.1 | 1.1 | 1.076 | 1.334 | 258 | 86.35 | 2.9878 |
| 67 | | S-24 | 6.9 | 9 | 2.1 | 1.074 | 1.542 | 468 | 164.85 | 2.8389 |
| 68 | | S-25 | 6.9 | 8.4 | 1.5 | 1.073 | 1.422 | 349 | 117.75 | 2.9639 |
| 69 | | S-26 | 6.9 | 7.8 | 0.9 | 1.071 | 1.284 | 213 | 70.65 | 3.0149 |
| 70 | | S-27 | 6.8 | 8.7 | 1.9 | 1.069 | 1.494 | 425 | 149.15 | 2.8495 |
| 71 | | S-28 | 6.8 | 8.7 | 1.9 | 1.067 | 1.469 | 402 | 149.15 | 2.6953 |
| 72 | | S-29 | 6.8 | 8.2 | 1.4 | 1.065 | 1.372 | 307 | 109.9 | 2.7934 |
| 73 | | S-30 | 6.8 | 8.5 | 1.7 | 1.064 | 1.462 | 398 | 133.45 | 2.9824 |
| 74 | | S-31 | 6.7 | 8.7 | 2 | 1.062 | 1.515 | 453 | 157 | 2.8854 |
| 75 | | S-32 | 6.7 | 8 | 1.3 | 1.061 | 1.345 | 284 | 102.05 | 2.7829 |
| 76 | | S-33 | 6.7 | 8.6 | 1.9 | 1.059 | 1.477 | 418 | 149.15 | 2.8025 |
| 77 | | S-34 | 6.6 | 8.4 | 1.8 | 1.057 | 1.43 | 373 | 141.3 | 2.6398 |
| 78 | | S-35 | 6.6 | 8.5 | 1.9 | 1.055 | 1.437 | 382 | 149.15 | 2.5612 |
| 79 | | S-36 | 6.6 | 8.4 | 1.8 | 1.054 | 1.406 | 352 | 141.3 | 2.4912 |
| 80 | | S-37 | 6.6 | 7.7 | 1.1 | 1.051 | 1.28 | 229 | 86.35 | 2.6520 |
| 81 | | S-38 | 6.5 | 8.3 | 1.8 | 1.049 | 1.398 | 349 | 141.3 | 2.4699 |
| 82 | KKBH-1 | S-1 | 6.5 | 8 | 1.5 | 1.047 | 1.321 | 274 | 117.75 | 2.3270 |

| ANNEXURE XIII: Bulk density data based on Archimedes' principle | | | | | | | | | | |
|---|-----------------|---------------|---------------------------|-------------------------|-----------------------|-------------------|----------------------------|--------------------|-------------------------------------|------------------------------------|
| SL. NO | BOREHOLE NUMBER | SAMPLE NUMBER | INITIAL WATER HEIGHT (cm) | FINAL WATER HEIGHT (cm) | INCREASED HEIGHT (cm) | WATER WEIGHT (kg) | WATER + SAMPLE WEIGHT (kg) | SAMPLE WEIGHT (gm) | VOLUME OF SAMPLE (cm ³) | BULK DENSITY (gm/cm ³) |
| 83 | | S-2 | 6.5 | 8 | 1.5 | 1.048 | 1.349 | 301 | 117.75 | 2.5563 |
| 84 | | S-3 | 6.4 | 7.4 | 1 | 1.044 | 1.206 | 162 | 78.5 | 2.0637 |
| 85 | | S-4 | 6.4 | 8.4 | 2 | 1.039 | 1.412 | 373 | 157 | 2.3758 |
| 86 | | S-5 | 6.2 | 7.7 | 1.5 | 1.031 | 1.301 | 270 | 117.75 | 2.2930 |
| 87 | | S-6 | 6.2 | 7.7 | 1.5 | 1.027 | 1.296 | 269 | 117.75 | 2.2845 |
| 88 | | S-7 | 6.1 | 7.7 | 1.6 | 1.023 | 1.281 | 258 | 125.6 | 2.0541 |
| 89 | | S-8 | 6 | 7.3 | 1.3 | 1.013 | 1.346 | 333 | 102.05 | 3.2631 |
| 90 | | S-9 | 6 | 7.1 | 1.1 | 1.009 | 1.258 | 249 | 86.35 | 2.8836 |
| 91 | | S-10 | 5.9 | 6.7 | 0.8 | 1.006 | 1.162 | 156 | 62.8 | 2.4841 |
| 92 | | S-11 | 6.7 | 8.6 | 1.9 | 1.072 | 1.41 | 338 | 149.15 | 2.2662 |
| 93 | | S-12 | 6.6 | 8.9 | 2.3 | 1.067 | 1.524 | 457 | 180.55 | 2.5312 |
| 94 | | S-13 | 6.6 | 7.9 | 1.3 | 1.064 | 1.318 | 254 | 102.05 | 2.4890 |
| 95 | | S-14 | 6.7 | 9 | 2.3 | 1.06 | 1.528 | 468 | 180.55 | 2.5921 |
| 96 | | S-15 | 6.7 | 9 | 2.3 | 1.064 | 1.494 | 430 | 180.55 | 2.3816 |
| 97 | | S-16 | 6.6 | 7.7 | 1.1 | 1.056 | 1.25 | 194 | 86.35 | 2.2467 |
| 98 | | S-17 | 6.5 | 7.8 | 1.3 | 1.051 | 1.293 | 242 | 102.05 | 2.3714 |
| 99 | | S-18 | 6.5 | 7.5 | 1 | 1.048 | 1.236 | 188 | 78.5 | 2.3949 |
| 100 | | S-19 | 6.4 | 7 | 0.6 | 1.043 | 1.163 | 120 | 47.1 | 2.5478 |
| 101 | | S-20 | 6.4 | 7.5 | 1.1 | 1.04 | 1.261 | 221 | 86.35 | 2.5594 |
| 102 | | S-21 | 6.3 | 7.4 | 1.1 | 1.036 | 1.242 | 206 | 86.35 | 2.3856 |
| 103 | | S-22 | 6.2 | 8.2 | 2 | 1.033 | 1.396 | 363 | 157 | 2.3121 |
| 104 | | S-23 | 6.2 | 7.5 | 1.3 | 1.03 | 1.271 | 241 | 102.05 | 2.3616 |
| 105 | | S-24 | 6.1 | 7.7 | 1.6 | 1.028 | 1.326 | 298 | 125.6 | 2.3726 |
| 106 | | S-25 | 6.1 | 8 | 1.9 | 1.025 | 1.391 | 366 | 149.15 | 2.4539 |
| 107 | | S-26 | 6 | 7.6 | 1.6 | 1.022 | 1.308 | 286 | 125.6 | 2.2771 |
| 108 | | S-27 | 6 | 7.4 | 1.4 | 1.02 | 1.28 | 260 | 109.9 | 2.3658 |
| 109 | | S-28 | 6 | 6.8 | 0.8 | 1.017 | 1.178 | 161 | 62.8 | 2.5637 |
| 110 | | S-29 | 6.6 | 7.7 | 1.1 | 1.015 | 1.344 | 329 | 86.35 | 3.8101 |
| 111 | | S-30 | 6.4 | 8 | 1.6 | 1.052 | 1.359 | 307 | 125.6 | 2.4443 |
| 112 | KTBH-1 | S-1 | 7.8 | 9.3 | 1.5 | 1.091 | 1.384 | 293 | 117.75 | 2.4883 |
| 113 | | S-2 | 7.8 | 9.8 | 2 | 1.088 | 1.505 | 417 | 157 | 2.6561 |

| ANNEXURE XIII: Bulk density data based on Archimedes' principle | | | | | | | | | | |
|---|-----------------|---------------|---------------------------|-------------------------|-----------------------|-------------------|----------------------------|--------------------|-------------------------------------|------------------------------------|
| SL. NO | BOREHOLE NUMBER | SAMPLE NUMBER | INITIAL WATER HEIGHT (cm) | FINAL WATER HEIGHT (cm) | INCREASED HEIGHT (cm) | WATER WEIGHT (kg) | WATER + SAMPLE WEIGHT (kg) | SAMPLE WEIGHT (gm) | VOLUME OF SAMPLE (cm ³) | BULK DENSITY (gm/cm ³) |
| 114 | | S-3 | 7.8 | 9.9 | 2.1 | 1.086 | 1.563 | 477 | 164.85 | 2.8935 |
| 115 | | S-4 | 7.7 | 9.6 | 1.9 | 1.084 | 1.493 | 409 | 149.15 | 2.7422 |
| 116 | | S-5 | 7.7 | 9.3 | 1.6 | 1.083 | 1.445 | 362 | 125.6 | 2.8822 |
| 117 | | S-6 | 7.7 | 9 | 1.3 | 1.081 | 1.38 | 299 | 102.05 | 2.9299 |
| 118 | | S-7 | 7.6 | 9.8 | 2.2 | 1.079 | 1.557 | 478 | 172.7 | 2.7678 |
| 119 | | S-8 | 7.6 | 9.9 | 2.3 | 1.077 | 1.585 | 508 | 180.55 | 2.8136 |
| 120 | | S-9 | 7.6 | 9.2 | 1.6 | 1.076 | 1.413 | 337 | 125.6 | 2.6831 |
| 121 | | S-10 | 7.6 | 9 | 1.4 | 1.074 | 1.387 | 313 | 109.9 | 2.8480 |
| 122 | | S-11 | 7.6 | 9.5 | 1.9 | 1.073 | 1.504 | 431 | 149.15 | 2.8897 |
| 123 | | S-12 | 7.5 | 9.1 | 1.6 | 1.07 | 1.433 | 363 | 125.6 | 2.8901 |
| 124 | | S-13 | 7.5 | 9.2 | 1.7 | 1.069 | 1.425 | 356 | 133.45 | 2.6677 |
| 125 | | S-14 | 7.5 | 9.8 | 2.3 | 1.068 | 1.575 | 507 | 180.55 | 2.8081 |
| 126 | | S-15 | 7.5 | 9.5 | 2 | 1.066 | 1.529 | 463 | 157 | 2.9490 |
| 127 | | S-16 | 7.4 | 8.9 | 1.5 | 1.064 | 1.397 | 333 | 117.75 | 2.8280 |
| 128 | | S-17 | 7.4 | 9 | 1.6 | 1.063 | 1.431 | 368 | 125.6 | 2.9299 |
| 129 | | S-18 | 7.4 | 9.3 | 1.9 | 1.061 | 1.486 | 425 | 149.15 | 2.8495 |
| 130 | | S-19 | 7.4 | 9.1 | 1.7 | 1.059 | 1.481 | 422 | 133.45 | 3.1622 |
| 131 | | S-20 | 7.3 | 9.2 | 1.9 | 1.057 | 1.426 | 369 | 149.15 | 2.4740 |
| 132 | | S-21 | 7.3 | 8.5 | 1.2 | 1.055 | 1.329 | 274 | 94.2 | 2.9087 |
| 133 | | S-22 | 7.3 | 9 | 1.7 | 1.053 | 1.404 | 351 | 133.45 | 2.6302 |
| 134 | KKBH-3 | S-1 | 7.2 | 8.3 | 1.1 | 1.049 | 1.25 | 201 | 86.35 | 2.3277 |
| 135 | | S-2 | 7.2 | 8 | 0.8 | 1.047 | 1.205 | 158 | 62.8 | 2.5159 |
| 136 | | S-3 | 7.1 | 8.8 | 1.7 | 1.049 | 1.348 | 299 | 133.45 | 2.2405 |
| 137 | | S-4 | 7.1 | 8 | 0.9 | 1.041 | 1.207 | 166 | 70.65 | 2.3496 |
| 138 | | S-5 | 7.1 | 8.3 | 1.2 | 1.037 | 1.275 | 238 | 94.2 | 2.5265 |
| 139 | | S-6 | 7 | 8.5 | 1.5 | 1.036 | 1.296 | 260 | 117.75 | 2.2081 |
| 140 | | S-7 | 7 | 8.7 | 1.7 | 1.031 | 1.368 | 337 | 133.45 | 2.5253 |
| 141 | | S-8 | 6.9 | 8.4 | 1.5 | 1.028 | 1.305 | 277 | 117.75 | 2.3524 |
| 142 | | S-9 | 6.8 | 8.7 | 1.9 | 1.023 | 1.387 | 364 | 149.15 | 2.4405 |
| 143 | | S-10 | 6.8 | 8.2 | 1.4 | 1.022 | 1.318 | 296 | 109.9 | 2.6934 |
| 144 | KKBH-2 | S-1 | 6.7 | 8 | 1.3 | 1.018 | 1.228 | 210 | 102.05 | 2.0578 |
| 148 | | S-5 | 7.6 | 8.8 | 1.2 | 1.088 | 1.315 | 227 | 94.2 | 2.4098 |
| 149 | | S-6 | 7.5 | 9.2 | 1.7 | 1.079 | 1.391 | 312 | 133.45 | 2.3380 |
| 150 | | S-7 | 7.3 | 9 | 1.7 | 1.073 | 1.408 | 335 | 133.45 | 2.5103 |

| ANNEXURE XIII: Bulk density data based on Archimedes' principle | | | | | | | | | | |
|---|-----------------|---------------|---------------------------|-------------------------|-----------------------|-------------------|----------------------------|--------------------|-------------------------------------|------------------------------------|
| SL. NO | BOREHOLE NUMBER | SAMPLE NUMBER | INITIAL WATER HEIGHT (cm) | FINAL WATER HEIGHT (cm) | INCREASED HEIGHT (cm) | WATER WEIGHT (kg) | WATER + SAMPLE WEIGHT (kg) | SAMPLE WEIGHT (gm) | VOLUME OF SAMPLE (cm ³) | BULK DENSITY (gm/cm ³) |
| 151 | | S-8 | 7.3 | 8.4 | 1.1 | 1.074 | 1.282 | 208 | 86.35 | 2.4088 |
| 152 | | S-9 | 7.1 | 8.4 | 1.3 | 1.062 | 1.305 | 243 | 102.05 | 2.3812 |
| 153 | | S-10 | 7 | 8.8 | 1.8 | 1.059 | 1.396 | 337 | 141.3 | 2.3850 |
| 154 | | S-11 | 7 | 8.8 | 1.8 | 1.052 | 1.4 | 348 | 141.3 | 2.4628 |
| 155 | | S-12 | 6.9 | 8.9 | 2 | 1.048 | 1.425 | 377 | 157 | 2.4013 |
| 156 | | S-13 | 6.9 | 8.3 | 1.4 | 1.043 | 1.333 | 290 | 109.9 | 2.6388 |
| 157 | | S-14 | 6.8 | 8.2 | 1.4 | 1.04 | 1.283 | 243 | 109.9 | 2.2111 |
| 158 | | S-15 | 6.7 | 8.6 | 1.9 | 1.028 | 1.41 | 382 | 149.15 | 2.5612 |
| 159 | | S-16 | 6.6 | 8.2 | 1.6 | 1.024 | 1.342 | 318 | 125.6 | 2.5318 |
| 160 | | S-17 | 6.6 | 8.5 | 1.9 | 1.021 | 1.418 | 397 | 149.15 | 2.6617 |
| 161 | | S-18 | 6.9 | 8.9 | 2 | 1.045 | 1.435 | 390 | 157 | 2.4841 |
| 162 | | S-19 | 6.8 | 7.8 | 1 | 1.039 | 1.25 | 211 | 78.5 | 2.6879 |
| 163 | | S-20 | 6.8 | 8.7 | 1.9 | 1.034 | 1.43 | 396 | 149.15 | 2.6550 |
| 164 | | S-21 | 6.7 | 8.7 | 2 | 1.03 | 1.419 | 389 | 157 | 2.4777 |
| 165 | | S-22 | 6.6 | 7.3 | 0.7 | 1.025 | 1.165 | 140 | 54.95 | 2.5478 |
| 166 | | S-23 | 6.6 | 8 | 1.4 | 1.021 | 1.296 | 275 | 109.9 | 2.5023 |
| 167 | | S-24 | 6.5 | 7.9 | 1.4 | 1.017 | 1.322 | 305 | 109.9 | 2.7753 |
| 168 | | S-25 | 6.5 | 7.8 | 1.3 | 1.014 | 1.204 | 190 | 102.05 | 1.8618 |
| 169 | | S-26 | 6.4 | 8 | 1.6 | 1.003 | 1.348 | 345 | 125.6 | 2.7468 |

| Annexure XIV: Analytical results of check samples by ICPMS (in ppm) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------|------|------|----|------|------|------|-----|------|-------|------|------|------|------|------|------|------|------|------|-------|-------|------|-------|------|-----|------|-----|-----|-----|-----|------|-----|------|-----|------|------|------|------|------|-----|
| Sl.no | Sample number | Li | Be | B | Sc | Co | Ga | Ge | Se | Rb | Y | Nb | Mo | Cd | In | Sn | Sb | Te | Cs | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Hf | Ta | W | Tl | Bi | Th | U |
| 1 | KTBH-1-S-8 | 14.8 | <0.5 | <5 | 8.9 | 24.5 | 12.9 | 0.7 | <0.5 | 116.4 | 23.2 | 4.9 | 0.8 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 81.4 | 129.2 | 11.8 | 52.2 | 7.7 | 1.8 | 7.7 | 0.7 | 3.8 | 0.8 | 2.5 | <0.5 | 2.2 | <0.5 | 1.9 | 0.8 | <0.5 | <0.5 | <0.5 | 31.5 | 0.9 |
| 2 | KTBH-1-S-9 | 14.1 | <0.5 | <5 | 8.0 | 19.9 | 11.7 | 0.8 | <0.5 | 84.9 | 18.6 | 4.9 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 97.8 | 149.9 | 13.6 | 61.1 | 8.0 | 1.5 | 7.0 | 0.6 | 3.5 | 0.6 | 2.1 | <0.5 | 1.7 | <0.5 | 2.3 | 0.7 | <0.5 | <0.5 | <0.5 | 32.7 | 1.4 |
| 3 | KTBH-2-S-5 | 18.1 | 0.5 | <5 | 8.2 | 19.4 | 14.3 | 0.6 | <0.5 | 107.5 | 21.5 | 4.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 78.0 | 122.9 | 10.8 | 49.0 | 6.9 | 2.0 | 6.2 | 0.6 | 3.9 | 0.8 | 2.6 | <0.5 | 2.1 | <0.5 | 1.3 | <0.5 | <0.5 | <0.5 | 19.7 | 0.8 | |
| 4 | KTBH-3-S-9 | 10.6 | <0.5 | <5 | 13.9 | 38.6 | 12.8 | 1.7 | <0.5 | 142.9 | 30.0 | 24.4 | 1.3 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 101.5 | 169.8 | 15.6 | 77.1 | 10.9 | 2.1 | 9.5 | 1.0 | 5.4 | 1.0 | 3.4 | 0.5 | 3.2 | <0.5 | 1.7 | 3.1 | <0.5 | 0.5 | <0.5 | 26.5 | 1.2 |
| 5 | KTBH-3-S-5 | 10.6 | <0.5 | <5 | 12.3 | 39.3 | 12.0 | 1.7 | 1.2 | 145.1 | 28.1 | 33.2 | 1.4 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | 0.6 | 158.6 | 267.5 | 24.9 | 115.2 | 16.2 | 2.4 | 11.6 | 1.1 | 5.4 | 1.0 | 3.3 | <0.5 | 3.0 | <0.5 | 0.9 | 3.9 | <0.5 | <0.5 | <0.5 | 30.3 | 1.6 |

| Annexure-XV: Comments of the peer reviewer | | |
|--|--|----------------------|
| SL. NO | COMMENTS | ACTION TAKEN BY MMPL |
| 1 | Page 4; CONTENTS; Edit the Fig numbers as suggested. In the Description part (of the Contents) provide the heading only, not the complete description. Corrections may be made in pages 2 to 8, as suggested. Fig 6.9 to 6.19 (page 4) modify the Title as ‘Photomicrographs of Khondalite’ etc. The details need not be given in the content page. The details are given in the text. | Complied with |
| 2 | SUMMARY: Page 10, Add title of the report. Summary should contain total number of samples collected, the highlights on Mineralization (both graphite and tungsten) as well as the Resource details. | Complied with |
| 3 | Page no 13; Table 2.A. Provide the total number of BH drilled in addition to total meter drilled. | Complied with |
| 4 | Page 17; Fig 2.2, 2.3 Change the heading as suggested. | Complied with |
| 5 | Page 20; Under Previous work, when details of the authors and the year of work are given, provide the organization name too (GSI/MECL...) | Complied with |
| 6 | Page 40; Trenching: Add a sentence on how much area (in the block) is soil covered. The trenches should have been numbered. | Complied with |
| 7 | Page 37; Table 6A Write the UNIT (%) in the table. | Complied with |

| Annexure-XV: Comments of the peer reviewer | | |
|---|--|--|
| SL. NO | COMMENTS | ACTION TAKEN BY MMPL |
| 8 | Page 86; Resource Estimation; Zone A ‘collectively the total thickness....is 49m.It should be explained in detail. | Complied with |
| 9 | Page 87; para 3 W mineralization. There are 4 number of W mineralization. True thickness 0.96m and 23.42m.is it the minimum and maximum? Average w value varies from 833 to 1565 ppm, it may be clarified. | As the analyses of check samples for W do not give encouraging results, therefore this point has not been adhered to. |
| 10 | Page no 90:Resource: Total resource of graphite(Zone A+B)may be added | Complied with |
| 11 | Page no 91: Resource: Total resource of tungsten (Zone A+B+C) may be added and shown. | As the analyses of check samples for W do not give encouraging results, therefore this point has not been adhered to. |
| 12 | Page no 87; It is very significant that high anomalous value of W ranging from 500 ppm to 1786 ppm(sample no ;KTBH1/S -09) has been recorded in this block. As given in the Annexure XII nearly 78 borehole core samples have shown 0.1% W, which is highly anomalous value and the block should be explored in detail for W. But the type of minerals (whether wolframite or scheelite) contributing for high w values has not been stated. These details may be added in the report. | As the analyses of check samples for W do not give encouraging results, therefore this point has not been adhered to. |
| 13 | Page no 98: Conclusion and Recommendation; Add few lines on lithological control of mineralization, extent, strike length and depth persistence of mineralization etc. The authors have rightly recommended the block to be taken up for W exploration, since high concentration of W has been recorded in the samples. This should be highlighted, | Complied the 1st comment but as the analyses of check samples for W do not give encouraging results, therefore this point has not been adhered to. |
| 14 | Annexure III Page no 126 to 130: Correct the spelling as suggested in the pages. | Complied with |
| 15 | Page no 175: Annexure XII; Provide the Unit for each element. | Complied with |
| 16 | Repetition of observations/points should be avoided as noted in page no19 | Complied with |
| 17 | Plate I ; Additional Pits/trenches should have been made to expose the lithounits and the mineralized zones, particularly around Kodabata and Talabarangapadar villages | Noted. |
| 18 | Plate III: Separate Plate (as Plate III) is not required to mark the BH location, as the same (BH locations) may be included in the Geological Map, i.e. Plate I or Plate II. | Complied with |
| 19 | Plate V; Heading may be changed as suggested. Write the borehole numbers as suggested. | Complied with |

| Annexure-XV: Comments of the peer reviewer | | |
|---|--|---|
| SL. NO | COMMENTS | ACTION TAKEN BY MMPL |
| 20 | . Plate VII: At borehole closed points the depth should be shown. Along the BH, for major W mineralised zones write the true thickness with W assay value. For eg: [2.5mx0.1% W] | As the analyses of check samples for W do not give encouraging results, therefore this point has not been adhered to. |
| 21 | The authors may be asked to attend to the corrections/modifications suggested in the text, plates of the report. | Complied with |